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SEASONAL RELATIONS OF CHOREA AND RHEUMATISM FOR A PERIOD OF FIFTEEN YEARS—1876 TO 1890 INCLUSIVE.[1]

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The present study is a continuation of a former paper upon the same subject read before the Philadelphia Neurological Society, October 25, 1886, published in the Philadelphia *Medical News* of November 13, 1886, and includes the *months of onset* of 1383 separate attacks of chorea, and 673 separate attacks of acute inflammatory rheumatism.

Of the former, 717 are from the note-books of the *Philadelphia Orthopædic Hospital and Infirmary for Nervous Diseases*, and include the 436 attacks reported in the paper alluded to; the 281 new attacks having been carefully extracted from the records for the years 1886–90 by my friend Dr. Charles W. Burr, to whom I am indebted for much assistance in the preparation of this paper.

The remaining 666 cases occurred in Boston, Mass., and have been collected for me through the kindness of Dr. James J. Putnam and Dr. Philip Coombs Knapp, of that city, from the records of the City Hospital, and the Massachusetts General Hospital, respectively.

The 673 separate attacks of acute inflammatory rheumatism have been collected from the records of the Pennsylvania Hospital, for the years 1876–90.

My intention was to collect statistics of these two diseases from several cities widely separated geographically, but I found that these records could not be obtained.

[1] Read before the Association of American Physicians, at Washington, May, 1892.

The weather records were extracted from the monthly reports of the Signal Service Bureau, and furnished through the kindness of the Washington and Philadelphia offices.

Sufficient of interest has been found to warrant this extended study, which was not undertaken to substantiate any particular theory, but to prove or disprove the results obtained in my former paper, where it was considered that a close relationship existed between the number of attacks of these two diseases and the number of storm centres passing within 400 miles of Philadelphia per month.

In the present study, as in the former, the "storm tracings" were obtained by taking the number of tracks of centres of low barometer passing within 400 miles of the localities studied, the 400-mile radius having been previously found to furnish the tracing most closely resembling that of chorea. The tables are so arranged that by the repetition of the first half of the year, any portion of any one tracing may be studied in unbroken sequence.

Certain sources of error must be alluded to, and although at present it is impossible to entirely eliminate them, it is not considered that the final result is thereby vitiated.

1st. The attacks recorded are but a portion of those occurring in the localities studied, while the meteorological data are complete as far as they go.

2d. The division of the year into months of unequal length is unfortunate but unavoidable, and all the numerical tracings, therefore, show a tendency to conform to this monthly irregularity; but even this does not vitiate their accuracy, as a reduction of the figures to a supposititious monthly length of thirty days does not materially alter their peculiarities.

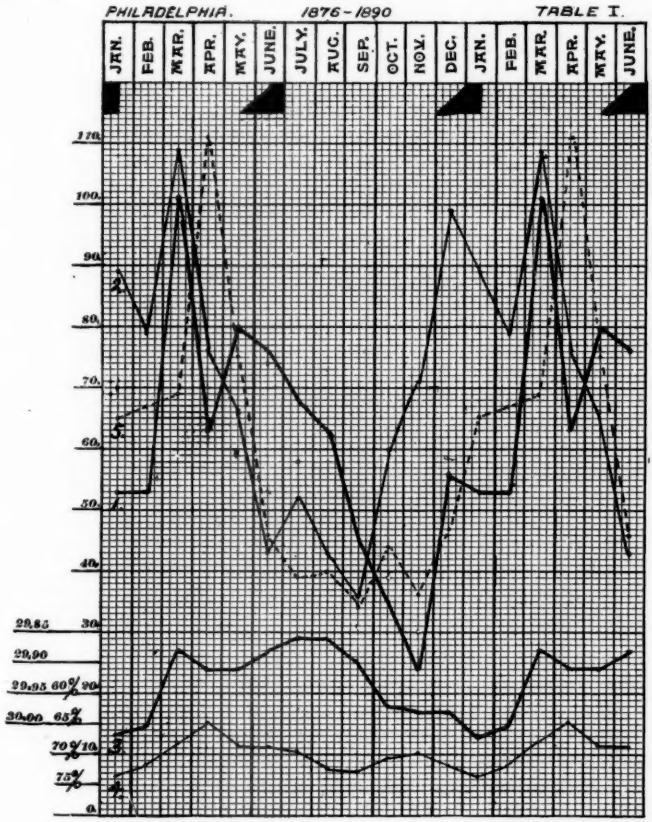
3d. Monthly *averages* tend to obliterate daily peculiarities and variations, for by taking the monthly mean of any element the very effect we wish to study may be smoothed out. This is further accentuated when monthly means for many years are taken.

4th. The methods of recording the tracks of centres of low barometer (storm centres) are, in the language of the weather reports, "approximately correct" only.

5th. Much difficulty has been encountered in obtaining definite answers as to the exact time of onset of the attacks. A large number of cases have, therefore, been discarded on this account, and only those retained for study that were apparently beyond doubt.

This objection probably pertains less to the records of the Orthopædic Hospital and Infirmary for Nervous Diseases than to hospitals in general, owing to the unusually accurate method of taking histories on blanks printed especially to investigate the various nervous diseases—the exact date of onset of chorea, for instance, being one of the points

particularly investigated. A failure to note this point correctly would naturally have a tendency to cause the case to be recorded as originating later on in the year than was actually the case.

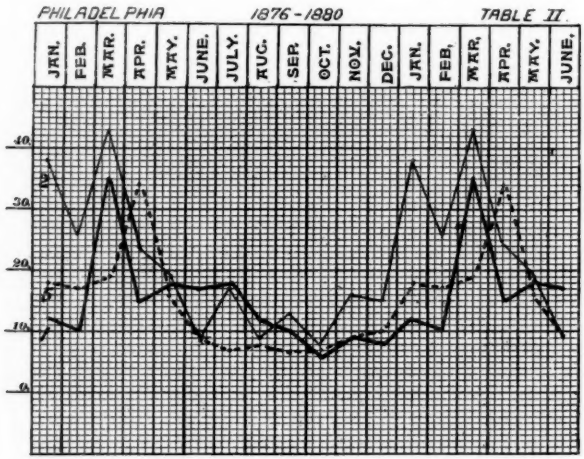


1. 717 separate attacks of chorea.
2. Storm centres passing within 400 miles of Philadelphia.
3. Mean barometer.
4. Mean relative humidity.
5. 673 separate attacks of acute inflammatory rheumatism.

6th. "Habit chorea," as far as the Philadelphia statistics are concerned, has been excluded from the list, but the cases due to *fright* have been unfortunately included with those due to other causes.

Table I. represents the data for Philadelphia for the fifteen years investigated, viz., 1876–90 inclusive.

Tracing 1, of this table, represents the months of onset of 717 separate attacks of chorea. It will be seen that November shows the fewest attacks, viz., 24, or 3.3 per cent.; a rapid rise occurs in December to 56, or 7.8 per cent. The tracing remains almost stationary during January and February, and then suddenly reaches its highest point in March, viz., 101, or 14 per cent. A fall occurs in April to 63, or 8.7 per cent.; a rise in May to 80, or 11.1 per cent., and then the tracing falls almost steadily to its lowest point in November.



1. 170 separate attacks of chorea
2. Storm centres.
5. 161 separate attacks of rheumatism.

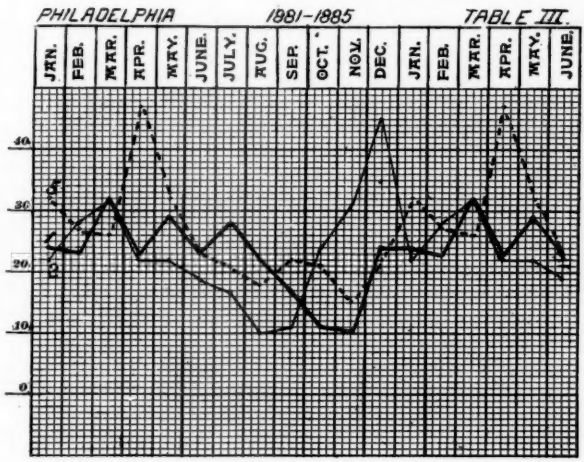
When this period of fifteen years is divided into three periods of five years and separately studied, the same character of tracing is still observed in each. See Tables II., III. and IV. The latter table is the most irregular, although still possessing many of the same features shown in II. and III.

Turning to the records obtained in Boston for the same period of fifteen years (Table V.), it will be found that of the 666 attacks there depicted (Tracing 1), the fewest also occur in November, viz., 30, or 4.5 per cent., although September, with 31 attacks, or 4.7 per cent., is practically the same. The line then rises, with a slight break in February, to its highest point in April, viz., 96, or 14.4 per cent., and then falls regularly and steadily to its lowest point in September and November.

The chorea record for Boston for the five years ending 1890 shows a somewhat different character of tracing (Table VI., Tracing 1, repre-

senting 357 cases). The months of March, April, May, and June are all practically alike—varying from 43 to 45 cases, 12 per cent. to 12.6 per cent. A fall then occurs, as before, to the lowest point in November, viz., 11 cases, or 3.1 per cent. This table includes 125 cases from the records of the Massachusetts General Hospital, the remainder being from the City Hospital records.

The irregularity of the tracing is due to the cases from the latter hospital, as those from the Massachusetts General, when taken alone, give



1. 266 separate attacks of chorea.
2. Storm centres.
5. 306 separate attacks of rheumatism.

a record very similar to the general tracing which pertains to Philadelphia, the high period being in March, 20 cases, or 8.8 per cent.

The cases from the City Hospital show the greatest number in April.

In regard to these cases Dr. Putnam writes me as follows:

"I had not this particular investigation in view when the record of these cases was made, so there may be some errors. The time of onset was sometimes given as 'two months ago,' that is, two months before the time I saw the patient. In all probability the mothers of the children would more likely have understated than overstated the duration of the disease."

An error in this direction, as previously stated, would naturally place the dates of onset of the attacks later on in the year than they should be.

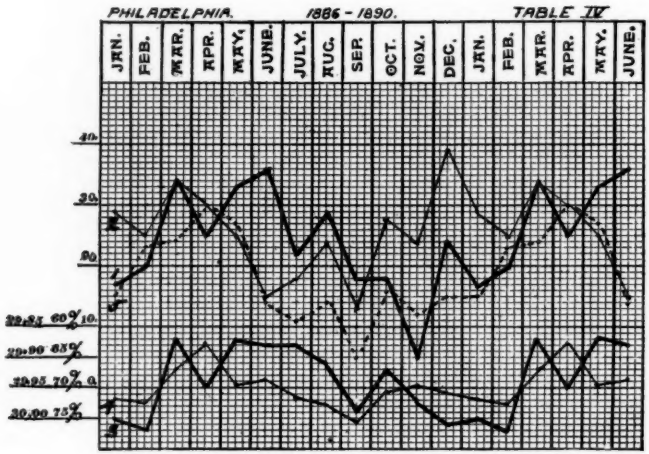
Adding all the cases together, month by month, gives the following result: January, 106; February, 101; March, 172; April, 159; May,

160; June, 150; July, 126; August, 106; September, 76; October, 74; November, 54; December, 99. Total, 1383.

This study of the largest number of attacks of chorea that, as far as I am aware, has been collected together, should prove the fact already noticed, by several observers, that chorea in the United States is essentially a disease of the spring, and that the fewest attacks occur in the autumn. So far, the *seasonal* relation is proven.

In order to see whether this spring augmentation was noticeable in the prevalence of disease in general, I have investigated the time of year when the greatest amount of sickness occurs in Philadelphia.

In my own practice, which is a general one, I find that the most visits are paid in March, viz., 15.3 per cent., and that from that point the per-



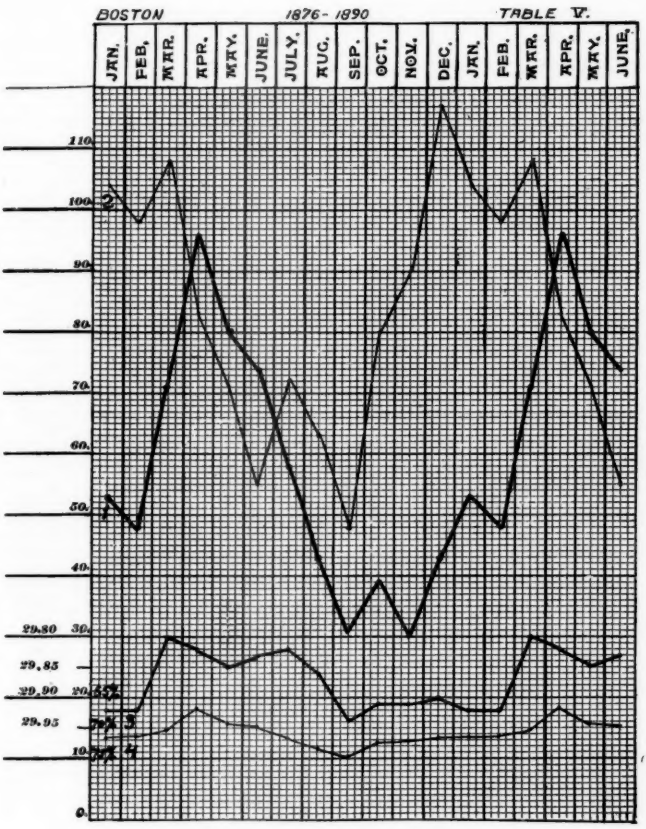
1. 281 separate attacks of chorea.
2. Storm centres.
3. Mean barometer.
4. Mean relative humidity.
5. 206 separate attacks of rheumatism.

centage of visits falls to midsummer (absence of patients from city largely influences this fall); then gradually rises to January to 13.3 per cent.; falls in February to 10.5 per cent., and rises to its highest point in March.

This varying percentage I find is about the same as regards the practice of other physicians whom I have interrogated concerning this point, and might be considered by some as a sufficient cause to explain the March rise in the Philadelphia chorea tracings, upon the theory that March is the month when most disease occurs; but might I not perti-

nently ask the question, What causes this March rise in the amount of disease?

Over-study has been considered by many to be one of the most potent causes of chorea. Sachs states (Keating's *Encyclopædia of Diseases of*



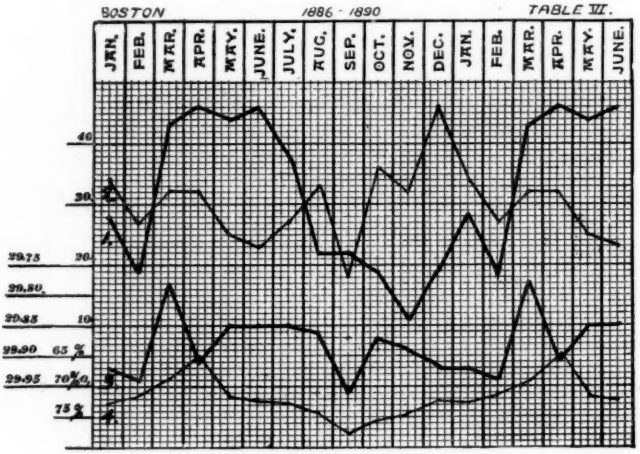
1. 666 separate attacks of chorea.
2. Storm centres.
3. Mean barometer.
4. Mean relative humidity.

Children, vol. iv.) that "many of the attacks occurring in early autumn follow upon the opening of school, and that in March the strain of winter duties is greatest;" and Sinkler (Pepper's *System of Medicine*, vol. v.)

states that "the annual examinations in our schools give a number of cases of chorea."

Upon inquiry I find that examinations in the Philadelphia public schools take place in the early part of January and in the latter half of June, and that preparatory reviews begin six weeks previously; that in February and March, the earlier months of the term, the pressure of study is very light; May being the hard month on account of the preparations for the final examinations in June.

In the normal schools, where the average age of the children is over fourteen years, the pressure of study in April and May is said to be



1. 357 separate attacks of chorea.
2. Storm centres.
3. Mean barometer.
4. Mean relative humidity.

severe, but it is not probable that any considerable number of these children are included in this study, as the public schools certainly furnish the vast majority.

I have endeavored to express graphically, by the wedge-shaped figures on the top of Table I., the time of the semi-annual examinations—the increasing width of the figure representing the increasing pressure of study during the reviews until the examination period is reached.

If over-study is the main exciting cause of chorea, why does the tracing reach its highest point in March, midway between the examinations, when no reviews are taking place and the study is light? Or, if this March rise is the after-effect of the hard work during the midwinter

examination, why does the tracing fall from its moderately high point in May as the final, and hardest, examinations of the year are approached? It is true that as the December reviews and the January examinations draw near there is a rapid rise in the number of attacks; but here again a slight fall in the tracing is seen *during the examination period*, when the worry might be supposed to be at its height.

The children with chorea applying at the Infirmary belong to an unusually intelligent class of society, and are themselves intelligent; as a rule, they are quite anæmic, and it is undoubtedly difficult to determine how much over-study has contributed to bring about this result and the exaggerated nervous susceptibility accompanying it.

The next etiological factor to be studied is the weather.

The "weather," using the word in its broadest sense to express the varying atmospheric and electrical phenomena which we call weather, is a strangely complex whole, which is exceedingly difficult to reduce to lines and figures.

It was thought that the record of "centres of low barometer," or "storms," as they occurred month by month, would, on account of the fact that a "storm" of necessity includes many meteorological factors, more fitly than any other series of figures represent the deleterious elements of "weather," but the present study does not entirely uphold the conclusions previously drawn in regard to this point.

In Table I. the storm line (Tracing No. 2) is singularly like that of chorea (Tracing No. 1) for the same period, in its general configuration, but there is a considerable lack of correspondence between them in summer and autumn; in the former the chorea line rises much higher, and in the latter falls much lower, than would be expected did the storm tracing express the true etiological factors of this affection.

Were the thunder-storms, which nearly all occur in summer, included in the storm tracing, the latter would be considerably augmented at the point where, upon this theory, there is the unexplained rise in the chorea tracing.

The Tables II., III., and IV., all show this same overlapping of these tracings in summer and winter.

In my former paper I made use of the following expression:

> "Anyone looking at these two tracings, as shown in the chart, will have to acknowledge that the marked resemblance which exists is more than accidental, but to decide which factor in this complex disturbance, which we call a storm, is the baneful one, or in what manner it acts, is difficult."

This conclusion was reached after studying the tracings for the years 1876–85 inclusive (which may be reproduced by adding together Tables II. and III.).

In the present study the addition of 281 more cases for the five years 1886–90 inclusive, does not, as we have seen, materially alter

the general configuration of the tracings; but upon dividing the whole number of attacks into periods of five years each, and studying them separately, it will be found that the last series (Table IV.) shows but a partial resemblance between the chorea and storm tracings. For instance, June shows the highest point reached by the chorea line, viz., 36 attacks, or 12.6 per cent., while the storm curve is almost at its lowest point, so that an element of doubt necessarily arises as to whether the principal exciting cause has been determined.

At this point of the study the thought arose that if the chorea and weather statistics for the same period of time, of several localities far apart, could be studied and compared, something of interest might be forthcoming, and the proper etiological value of weather influence determined. The only statistics that could be obtained, after considerable effort, were those of Boston, kindly furnished me by Drs. Knapp and Putnam.

Table V., Tracing No. 1, shows the tracing obtained from the study of these 666 cases of chorea occurring in Boston during the fifteen years 1876–90 inclusive; this tracing has been previously described. The storm tracing of this table (No. 2) resembles in its general aspect the corresponding tracing for Philadelphia (Table I., No. 2), the two maxima and minima coinciding exactly, as would be expected; but on comparing it with its accompanying chorea tracing, the resemblance between them is not as pronounced as is seen in Table I., and there is a greater exaggeration of the winter dissimilarity previously alluded to. When the storm tracing for Boston for the years 1886–90 inclusive (Table VI., No. 2) is compared with its accompanying chorea tracing (No. 1), previously described, for the first time but little resemblance is seen between them.

Unable to find a satisfactory explanation, that will cover all cases, in the storm tracings, I again turned to the records of the mean actual barometer and mean relative humidity.

On this point I previously remarked "that there appears to be an increase in the number of attacks of chorea with a fall of the mean relative humidity and barometer tracings."

To make these tracings more intelligible they have been reversed in the tables, so that any relationship between them and the other tracings may be more readily detected.

Naturally some resemblance might be expected to exist between these tracings and that of the storm centres, as they are component parts of the storm disturbance. The rise and fall of the barometer tracing (No. 3) in the various tables bears a considerable resemblance to that of chorea, and this is particularly noticeable in Tables IV. and VI., where the resemblance of the storm to the chorea tracing is least marked. It must be borne in mind that Tracings 3 and 4 are reversed, a rise in the tracings really expressing a fall, and *vice versa*.

The tracing obtained by recording the number of cloudy or rainy days, and also that by measuring the precipitation in inches of rain and snow, being also component parts of a storm, bear some resemblance to the latter tracing; they are not represented in the tables, as a large number of lines is confusing.

The average monthly temperature steadily rises to its highest point in July from its lowest point in January, and as steadily falls again.

The high spring point of the chorea tracing corresponds with cool weather and a *low* barometer and mean relative humidity tracing, but the rise in the autumn corresponds with cool weather and a comparatively *high* barometer and mean relative humidity, the temperature record, therefore, giving us but little information.

Table I. shows the months of onset of 673 separate attacks of acute inflammatory rheumatism occurring in Philadelphia for the years 1879–90. (Tracing No. 5.)

April has 111 attacks, or 16.5 per cent. A rapid fall occurs until the lowest point in September is reached—34 attacks, or 5.1 per cent.—and from this point the line somewhat irregularly rises until the high point in April is reached. Each of the Tables II., III., and IV. show this same character of the rheumatism tracings and the marked resemblance which they bear to the fluctuations of the storm record, the high point in the latter antedating the month of greatest number of attacks of rheumatism, as if its influence was preparatory, as remarked in my former paper.

Unfortunately, no trustworthy records of this disease could be obtained from other cities to compare with those of Philadelphia.

If it is conceded that the relation is positive, as far as cause and effect are concerned, between storm and neuralgia, why may not the same relationship, although possibly to a different degree, be conceded to exist between the varying meteorological conditions and other nervous diseases, notably chorea, which occur in children who are in an unstable nervous condition, depressed in vitality, and possibly over-worked and over-taught?

The conclusions drawn from this paper are as follows:

1st. The seasonal relationship of chorea and rheumatism is proven.

2d. There is a marked resemblance in form between the chorea and rheumatism tracings and the tracing representing the total amount of sickness present in the community per month.

3d. This monthly variation in amount of sickness is not a cause of the fluctuation in the chorea and rheumatism tracings, but is itself probably due to the same influence.

4th. While over-study assuredly plays a most important rôle in predisposing children to chorea, the months of greatest study, and therefore presumably of the greatest depression of bodily vigor, do not coincide

with, or even precede with any regularity, the months of greatest frequency of this disease.

5th. It is more than probable that "weather" is one of the most important predisposing causes of both of the diseases studied in this paper, although precisely which meteorological factor is the baneful one does not clearly appear. No one element of "weather" explains fully the fluctuations of these tracings for chorea, although in the barometer and storm statistics the relationship appears to be closer than to any other etiological factor or factors that have, as yet, been advanced.

It is as if a conclusion was attempted to be drawn from premises, some of which are imperfectly stated or not clearly understood, or possibly even overlooked.

6th. Either this apparently close relationship must be acknowledged to have an important place in the etiology of these diseases, or else the resemblance must be considered to be purely accidental, which seems most unlikely from a study of the tables shown.

More accurate deductions do not appear possible from the data at present at our command.

Explanation of Tables.

In all the tables, Tracing No. 1 represents chorea; No. 2, storm centres passing within 400 miles of the locality studied; No. 3, mean actual barometer; No. 4, mean relative humidity; No. 5, acute inflammatory rheumatism.

Tracings Nos. 1, 2, and 5 are interpreted by using the columns of figures commencing at 0 and ascending regularly by increments of 10; Tracing No. 3, by the figures representing barometer readings; and No. 4, by the figures representing percentages. Tracings Nos. 3 and 4 are reversed.

In Table I., Tracing No. 1 represents 717 separate attacks of chorea; in Table II. it represents 170; in Table III., 266; in Table IV., 281; in Table V., 666; and in Table VI., 357.

Tracing 5 represents, in Table I., 673 separate attacks of acute inflammatory rheumatism; in Table II., 161; in Table III., 306; and in Table IV., 206.

COMBINED GYNECOLOGICAL OPERATIONS.

By George M. Edebohls, A.M., M.D.,
gynecologist to st. francis' hospital, new york.

The fact cannot be gainsaid that the marvellous progress in the diagnosis and treatment of diseases peculiar to women, attained within the past decade, is due almost entirely to surgical as distinguished from purely medical gynecology—which, stated in other words, means that modern gynecology is essentially surgical.

Surgical it is, and in a surgical direction its advances in the near future are likely to be made: surgery bred of increasing experience and knowledge in diagnosis and pathology; surgery based upon clear and rational indications and growing ever more exact and skilful in its methods; surgery, finally, inspired solely by one consideration, namely, the best interests of the patient, all things considered, in the individual case. In determining the latter point the personal equations of both operator and patient will come largely into play and prove important factors in reaching a decision as to the best mode of procedure.

The uncertainties of other methods of treatment as compared with surgical measures are proverbial. Not that for this reason other methods are to be discarded. But in proportion as the risks from surgical treatment can be diminished will surgery steadily gain in favor, both on account of its more positive and permanent results, and the shorter time required for cure in the very great majority of cases. The latter is a very important consideration, and it must be the constant endeavor of the progressive gynecologist to still further reduce the time required to lead a case to a successful issue by surgical measures.

In a line with this thought is the subject of combined gynecological operations, by which is meant the performance, at the same sitting and upon the same patient, of various gynecological operations heretofore usually distributed over several sittings. Not alone are valuable time and much bodily suffering and mental anguish thus saved the patient, but the results of our procedures are likely to be much more perfect.

Let us take, for instance, a case of complete procidentia uteri, the cure of which is attempted by plastic operations. Let us suppose that curettement, amputation of the cervix, anterior and posterior colporrhaphy, perineorrhaphy, and ventro-fixation of the uterus are all indicated by the existing pathological conditions. It will make a world of difference in the result, as well as in the time required to attain a successful result, whether the operator is able to perform all these operations within a reasonable time, at one sitting, or whether he will be obliged to leave one or more of them to be performed at one or more subsequent sittings. Say, for instance, every operation above named is performed save the ventro-fixation. It is common experience that plastic operations below, however skilfully performed, are in the very great majority of cases insufficient to withstand the continuous tendency of the uterus to again descend, favored as that tendency is by the relaxation of all pelvic supports due to the prolonged prolapsus. As a result, when the time arrives at which the ventro-fixation can be added, it will be found that one or more of the plastic operations on the vaginal wall and perineum may have to be done over. Or if the perineorrhaphy be omitted and the ventro-fixation performed at the first sitting, the lack of support below will allow the uterus to tear itself away from the adhesions, holding it

to the anterior abdominal wall. That both of these cases are not suppositious, my own experience in my first case sadly taught me, just as my later experience has demonstrated that when all the above-named operations are performed at the same sitting, a good result may be confidently anticipated.

Further than this, the cure is complete in from three to four weeks, as compared with an indefinite period demanded when the operations are performed at different times; and the patient is spared that unenviable frame of mind associated with looking forward to an indefinite number of operations to follow each other at indefinite intervals of time.

The writer firmly believes that the next step forward in gynecological surgery will be in the direction of the *simultaneous* performance of as many operations as the patient may require to make her well, and that the gynecologist of the highest skill in operative work—which, to my mind, almost necessarily presupposes also the greatest skill in diagnosis—will consider that he has done justice neither to himself nor to his patient, unless, as a rule, admitting of but rare exceptions, he will be able safely and well to do all the surgery required in her case at a single sitting. It is the purpose of this paper to record some of the efforts made by the writer in this direction.

To do combined operations *with safety to the patient*, presupposes, first of all, perfect asepsis and a not too prolonged anæsthesia. The operator must feel almost absolutely sure that no symptom of sepsis can arise after operation to harass his mind with doubts as to which of his operative procedures has been at fault in this regard. Otherwise his state of mind, both at the time of and after operation, must be far from enviable.

As regards the period of time during which a patient may safely remain under the effects of an anæsthetic, individual opinions will probably vary very widely. I myself have placed the practical limit in my own work at one and a half hours, and have but on two or three occasions needed more time than this, no matter how many combined operations were required.

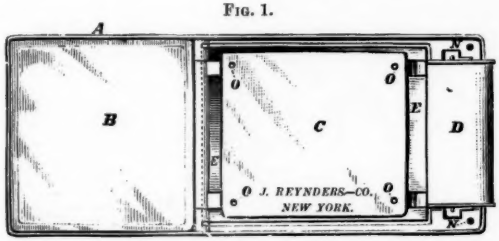
To do combined operations *well* within the time limits of safe anæsthesia, requires, in addition to the necessary degree of operative skill and dexterity, sufficient and efficient assistance, a perfected technique of the various operations attempted, and an instrumentarium suitable to rapid work.

Perhaps, then, I may be pardoned a brief description of the technique of the various typical operations entering into combinations, as I have practised them, before giving attention to the combinations themselves.

All of the various operations now to be described are performed upon the author's combined laparotomy and gynecological operating-table, a description of which may be found in the *Medical Record*, N. Y., Nov. 14, 1891.

Operations upon the uterus, cervix, and anterior vaginal wall are all performed with the patient in the dorsal position, and with the aid of

FIG. 1.



Edebohls' operating-table. Top of table. *A*, metal frame; *B*, polished glass plate for head and shoulders; *C*, ditto, for body; *D*, metal surface; *E*, trough; *N*, holes for foot-supports.

FIG. 2.

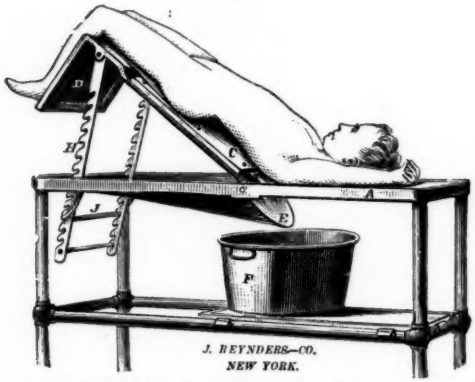
Table, complete, with foot-supports (*K*) and ankle-straps (*L*).

the writer's self-retaining speculum, described at length in the *Medical Record*, N. Y., March 7, 1891, p. 283. I have lately somewhat modified the speculum,[1] making it smaller and more portable, although preserving

[1] The instrument, as originally made, was hammered out of copper by hand. In the further course of manufacture the original design was more or less arbitrarily departed from, until the instrument as turned out by different makers often assumed shapes so distorted, fantastic, and grotesque that it was with difficulty recognized even by its originator. Mr. E. Bocker, 582 Hudson Street, New York, under my supervision, finally took a great deal of pains to make an accurate model, and had a mould made of the same. The instrument as now turned out by him and by John Reynders & Co., being cast, has the advantage of uniform correctness of shape.

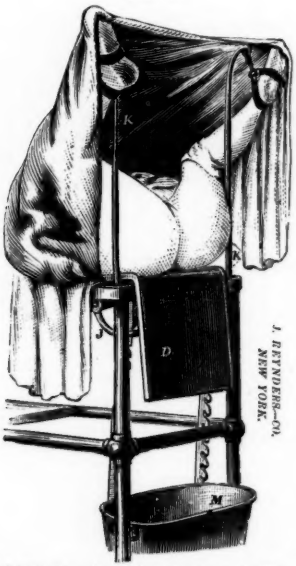
its essential characteristics. The modified instrument measures a little less than 10 centimetres in its longest diameter and fits into its accom-

FIG. 3.



Table, showing method of obtaining the Trendelenburg posture. Any position between the horizontal and an inclination of 45° may be obtained on the table.

FIG. 4.



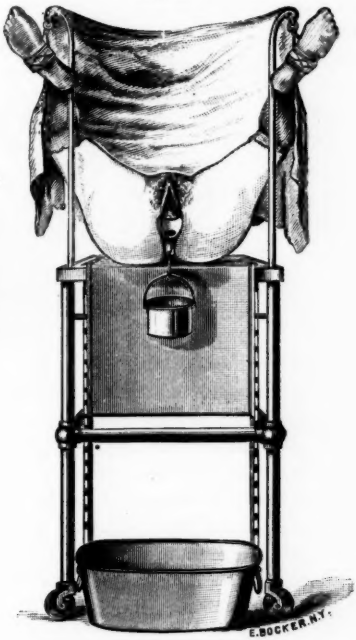
Table, showing modified lithotomy position, for examination, and for operations upon perineum, vagina, uterus, and bladder. *D*, carrying the buttocks of patient, can be raised to any convenient height.

panying pail. The latter is 10 centimetres in diameter, 7.5 centimetres deep, and has a capacity of about 6.60 grammes. Any pail, however,

Fig. 5.

Self-retaining vaginal speculum.

Fig. 6.



Speculum, showing method of use.

with a capacity up to a litre, may be used, or an equivalent solid weight may be substituted.

The use of constant irrigation, as facilitated by this speculum, is a decided advantage as compared with the use of sponges in the performance of combined operations, diminishing the risk of sepsis and contributing materially to rapidity of work. Personally I have discarded the use of sponges for any and every purpose, using constant irrigation for plastic work on uterus, cervix, vagina, and perineum, and sterilized gauze serviettes for all other operations, including abdominal section.

As an anæsthetic I all but invariably employ ether, administered by means of Parkinson's modification of Ormsby's inhaler.

The advantages of this inhaler are its simplicity of construction and management, the small quantity of ether required—three to four ounces being sufficient for an hour—and the avoidance of the diffusion of ether

vapor through the operating-room. After a use of the Parkinson inhaler extending back over nearly three years, I have nothing but words of commendation for it, and the smoothness of the anæsthesia has been a matter of frequent comment by visitors to my operating-room.

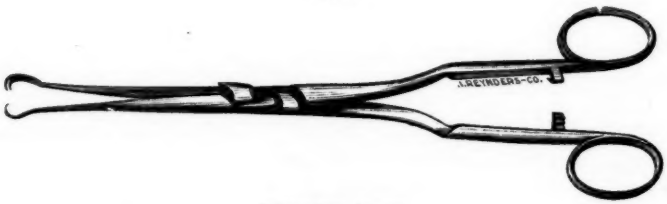
Fig. 7

Parkinson ether-inhaler.

I will now proceed to describe, as briefly as I may, the details of technique, as I now practise them, in the various gynecological operations.

Currettement of the Uterus.—With the patient in the dorsal position and after thorough disinfection of the vagina with creolin-mollin, 10 per cent., followed by irrigation with 1 : 2000 sublimate solution, the speculum is introduced and the anterior lip of the cervix seized and drawn down by the double tenaculum forceps herewith illustrated. The tenaculum forceps has two teeth on one point, and a single tooth, fitting between these two, on the opposite point.

Fig. 8.



Tenaculum forceps.

The points as well as the ratchet lock on the handle are kept in true working order by means of the improved antiseptic lock which I have elsewhere described. (*Medical Record*, N. Y., March 15, 1890, p. 310.) It has proved to the writer a most valuable and practical instrument in almost all his plastic and abdominal work. A few additional instances of its utility will be alluded to further on in the paper.

After seizing the anterior lip, the cervix is dilated, if necessary, by a

simple dilator (I prefer the ordinary two-branched, glove-stretcher form, Sims' or Wylie's modification thereof); a double-current catheter (Bozeman, Fritsch, or Kelly) is introduced and the uterine cavity washed with a 1 : 2000 sublimate solution. A *sharp* curette is next introduced and the *entire mucous membrane* of the uterus systematically scraped out until the harsh grating sound and feel of the curette as it passes over the tissues informs us that the submucous and muscular layers have everywhere been reached. A curettement of the uterus, as may be gathered from the above, to me means an *abrasio mucosæ totalis*—an entire removal of the mucous membrane. Nothing less than this do I consider satisfactory or sufficient. The curettement can be still more satisfactorily accomplished by having an assistant draw lightly on the tenaculum forceps grasping the cervix. This releases the operator's left hand, the index finger of which can be passed up the vagina along the outside of that portion of the uterus we are curetting. This finger forms an excellent *point d'appui* to the curette within the uterus, and thus aids materially in rapid and thorough work. One or twice during the progress of the curettement, and again at its close, the uterus is thoroughly washed out with 1 : 2000 sublimate solution. There are very few combinations of gynecological operations into which curettement does not with advantage enter.

Trachelorrhaphy.—My method of performing this operation differs in no wise from that usually employed, except that I use a lance-shaped knife instead of the scissors, to remove such tissue as may be

FIG. 9.

Double-edge lance-shaped knife.

required both in this operation and in amputation of the cervix. I find, however, that where combined operations are called for, amputation of the cervix is much more frequently indicated than trachelorrhaphy. On consulting my records for the past two years I find that I have performed three times as many amputations of the cervix as trachelorrhaphies.

Amputation of the Cervix.—The modification of Simon and Marckwald's operation adopted by Skene of Brooklyn, and so well described and pictured by the latter in his treatise on the *Diseases of Women*, 1889, page 345, leaves little or nothing to be desired, and I practise it strictly as there depicted, with only one exception. Instead of embracing the cervix above the seat of amputation with an elastic ligature to control hemorrhage, I secure the latter object by passing a curved needle armed with a catgut ligature around the circular artery high up on

each side of the cervix. The ligatures are drawn tight and allowed to remain until removed by absorption. I was led to adopt this procedure after two or three unpleasant experiences with secondary hemorrhage after the employment of the elastic ligature, and have since had no further trouble in this direction. When perineorrhaphy enters into the combination with trachelorrhaphy or amputation of the cervix, I prefer to use sutures of absorbable chromicized catgut (Doederlein, "Resorbirbares Chromsaureskatgut," *Centralbl. f. Gyn.*, 1890, p. 534), or those prepared from the tendon of the tail of the kangaroo, for the latter two operations. Otherwise, I prefer to sew the cervix with silkworm-gut. In work on the cervix the Hagedorn needle and the tenaculum forceps above described have been found especially serviceable, the latter in lieu of the tenaculum ordinarily used. It never slips its hold until released by the operator.

Anterior and Posterior Colporrhaphy.—The limits of the vaginal wall to be removed are fixed by four toothed sponge-holders; the tissue to be

FIG. 10.

Toothed sponge-holder.

removed is rapidly circumscribed and cut at the same time by a sharp-pointed scissors, one point of which, after piercing the mucous membrane of the vagina, is made to traverse along the connective-tissue plane between the vagina and the bladder or rectum. The segment of vaginal wall thus circumscribed is now peeled *entirely* from the underlying bladder or rectum, following the connective-tissue plane as a guide. In this lies the secret of success in both operations, as by doing so we reach vascular parts which will unite firmly after suture. The timid or inexperienced operator will fail right here, removing the vaginal wall in part of its thickness only, the deep layers of the vagina presenting raw surfaces ill adapted to firm union. I prefer to close the denuded surface thus made with buried kangaroo or chromicized catgut suture in tiers, and have thus far never failed to secure full primary union. I have tried and abandoned the Stoltz or purse-string method described by Mundé (*Am. Journ. of Obstet.*, 1890, p. 268) as the "best" for cystocele. It is theoretically and practically incorrect, in that it shortens the vagina in its length as well as in its circumference, a thing it is rarely, if ever, desirable to do.

Perineorrhaphy.—The method invariably employed is that described by the author in a paper entitled "A New Method of Suture in Perineorrhaphy," published in the *Am. Journ. of Obstet.*, October, 1890. I there reported ten cases, all of incomplete laceration. Since

then I have operated upon twenty-seven cases more, five of which were complete tears into the rectum, making thirty-seven cases in all. In every single one of them I obtained primary union and a perfect result at the first operation.

Shortening of the Round Ligaments—is performed after the author's method as described in the *New York Medical Journal*, October 11, 1890. After an experience with the method now embracing fifty-one cases, I am more pleased with it than ever, both as regards the immediate and ultimate anatomical and therapeutical results. The only modification in the operation as described is a slight one in the method of suture. I now close the canal and secure the ligament by buried silkworm sutures embracing the cut fascia of the external oblique muscle and the ligament; uniting the superficial fatty layer and skin by a running suture of catgut. I would here like to emphasize one point only, a disregard of which will surely lead to disappointment: shortening of the round ligaments is neither alone nor in combination a suitable operation for prolapsus uteri. The sole indication for the operation is a non-adherent retroverted uterus with normal-sized, non-adherent tubes and ovaries, and then only when the symptoms are plainly referable to the retro-displacement. I have within the past six months, however, in two cases of adherent retroversion with normal-sized appendages, released the uterus from its adhesions under narcosis, after the method of Schultze (without a laparotomy), and secured the uterus in anteversion by shortening the round ligaments.

Ventro-fixation of the Uterus.—I will describe the operation as I perform it in adherent retroversion, and in combination with other operations for prolapsus uteri, leaving out of account those cases in which it is performed in the course of laparotomy for other conditions—diseased adnexa, and so forth.

An incision four or five centimetres long is carried through the abdominal wall in the median line anteriorly between the umbilicus and pubes, the patient being in the Trendelenburg posture. Two fingers are then introduced, the pelvis is explored, and the uterus, if adherent, is liberated. The anterior surface of the uterus is next grasped with the tenaculum forceps at a point on a line with and midway between the origin of the Fallopian tubes, and the uterus brought forward to and sustained behind the abdominal incision. Three silkworm sutures are next passed embracing fascia, muscle, peritoneum, and a section of the anterior uterine wall two or three centimetres wide and six to eight millimetres deep. One suture passes on a level with the origin of the tubes, the second below, and the third above that level. Two or three silkworm sutures embracing fascia, muscle, and peritoneum are inserted to close the balance of the deep parts of the abdominal wound. The tenaculum forceps is removed and the anterior face of the uterus

between the points of entrance and exit of the three sutures is scarified by scraping off its peritoneum. All the silkworm sutures are now tied, cut short, and buried by closing over them, with running catgut suture, the skin and superficial fat. The author has performed ventro-fixation as above described for retroversion and prolapsus twenty-one times, exclusive of nearly an equal number of cases in which it was performed in the course of laparotomies undertaken for the relief of other conditions. All have recovered, and I know of none in which the uterus has again become retroverted or prolapsed, although a number of my cases are over three years old.

Nephrorrhaphy.—An incision extending from the twelfth rib to the crest of the ilium is carried through the posterior abdominal wall along the outer edge of the quadratus lumborum and erector spinæ muscles until the peri-renal fat is reached. This is drawn out of the wound until all slack around the kidney is taken in, and the redundancy is cut off with scissors. In doing this care must be exercised not to drag up and open the peritoneum near the lower pole of the kidney. The capsula propria of the kidney is thus exposed and is incised mesially, along the length of the convexity of the kidney, to the extent of seven or eight centimetres. This incision in the capsula propria should involve the lower half of the kidney rather more than the upper, as it is desirable to elevate the kidney as much as possible beneath the ribs while mooring it to the posterior abdominal wall. The incised capsula propria is peeled off from the kidney substance to the extent of 1.5 centimetres on either side of the incision along its entire length, and is reflected like the lapel of a coat, thus laying bare quite a large area of raw kidney surface. From four to six silkworm sutures are passed, embracing the muscles and fascia of the abdominal wall, the cut edges of the fatty capsule, the reflected as well as the still adherent capsula propria, the kidney substance itself, to the extent of including all the portion stripped of capsule to a depth of six or eight millimetres from the surface. A drain composed of eight or ten strands of silkworm-gut is laid along the raw kidney tissue at the bottom of the wound, the ends of the drain emerging at either angle of the wound. The silkworm sutures are tied, cut short, and buried by closing the superficial fat and skin over them with running catgut. Usual antiseptic dressings.

I have performed nine nephrorrhaphies for movable kidney after the above method, my first operation bearing date of February 6, 1890, and do not know of a kidney so fixed becoming subsequently movable.

Suture Material.—The materials used for suture play an important part in combined gynecological operations, and may, therefore, well claim a moment's attention. I use for various purposes silk, silkworm-gut, catgut, tendons from the tail of the kangaroo, and chromicized catgut.

Silk is used only for suture of intestine, and as a retractor in abdominal section, either lip of the wound being pierced and drawn outward by a piece of heavy silk.

Silkworm-gut is used in perineorrhaphy, and in operations upon the cervix invariably when perineorrhaphy is not performed at the same sitting, and sometimes even when it is. As a buried interrupted suture it is used for the following purposes: To close the canal, and anchor the ligament in the operation for shortening the round ligaments; to unite fascia, muscle, and peritoneum in abdominal section; to attach the kidney to the muscular and fibrous structures of the abdominal wall in nephrorrhaphy; to secure the uterus to the deep structures of the abdominal wall in ventro-fixation. In bundles of from six to ten strands it forms an excellent material for drainage in Alexander's operation, nephrorrhaphy, and occasionally as a drain for the excessively thick fatty tissue of the abdominal wound in laparotomy. Its non-absorbability, strength, and insusceptibility to change constitute excellent qualities where secure and lasting closure of the firmer deep tissues and fixation of solid organs are required. It is as aseptic as silver wire, and as easily manipulated and tied as silk.

Catgut in suitable sizes is used for all ligatures, and as a running suture loosely applied to hold together the superficial fat and skin in wounds of those tissues. Silkworm-gut in interrupted buried sutures to close the firmer deep tissues, and catgut loosely applied to unite the superficial fat and skin, form the most satisfactory method of closure of wounds such as the gynecologist is required to make.

I have used kangaroo tendon quite extensively for some months past, but fail to see that it possesses any advantages over chromicized catgut. The latter, prepared as resorbable chromicized catgut, after the method of Doederlein, is superior in every way, cost included, to kangaroo tendon.

Combined Gynecological Operations.—Coming now to the subject proper of the various combinations of gynecological operations, they may properly be divided into two general classes:

1. Those combinations into which a laparotomy does not enter.
2. Combinations of which a laparotomy forms part.

The first class embraces, as far as the writer's own practical experience goes, curettement, amputation of the cervix, trachelorrhaphy, anterior and posterior colporrhaphy, lateral colporrhaphy, perineorrhaphy, shortening of the round ligaments, and nephrorrhaphy.

The combinations of this class perhaps most frequently called for are curettement and amputation of the cervix or trachelorrhaphy, and the combination of these with perineorrhaphy. These combinations should always be easily performed within the hour—I have done them repeatedly in half the time—and the writer holds that it would be gross

injustice to a patient at the present day to submit her to two sittings for their performance. Indeed, an operator claiming to be an expert should, as a rule almost without exception, be able to perform any combination of operations in this first class that may be required in the individual case, excluding only those combinations into which shortening of the round ligaments enters, within an hour and fifteen minutes. The operation for shortening the round ligaments—really a double operation—properly performed, requires from twenty to forty-five minutes, and may even, in case of unusual difficulty in finding and isolating the ligaments, be protracted a little beyond the latter limit.

The combination of operations of the first class next most frequently called for in the writer's experience, is curettement, amputation of the cervix or trachelorrhaphy, and shortening of the round ligaments. This combination I have performed fourteen times and never required above seventy-five minutes. In one additional instance a perineorrhaphy was added to this combination without exceeding the time-limit just named.

Next in frequency come the two following combinations: 1st. Anterior colporrhaphy and colpo-perineorrhaphy; 2d. Amputation of cervix, shortening of round ligaments, and perineorrhaphy. I find on my records memoranda of three of the first and four of the second combinations performed during the past two years. The time required for the first combination averaged thirty, that for the second combination seventy-five minutes. In one additional instance a trachelorrhaphy, in a second an amputation of the cervix, and in a third a curettement were added to the first combination, all performed within the hour.

Nephrorrhaphy for movable kidney entered into combination with operations enumerated under the first class three times. Once it was combined with curettement for chronic endometritis and catarrhal salpingitis. A second time it was performed at the same sitting with curettement and trachelorrhaphy. In both instances I finished within the hour. On a third occasion curettement, shortening of the round ligaments, and nephrorrhaphy were performed together in one hour and twenty minutes.

There is no excuse for a mortality in any required combination of operations included in the first class. Perfect asepsis secures against infection, and the good judgment, alertness and skill of the operator should insure his patient against the risks of prolonged anæsthesia and accidental dangers.

The indications for the various combinations of operations of the first class are given by the various combinations of pathological conditions existing in the particular case, and it is perhaps not too much for a woman who at the present day places herself under the care of a specialist in gynecology for operation to expect that all operative procedures required in her case, provided a difficult laparotomy be not among the

number, be performed at one sitting. Indeed the modern woman worthy of the times may soon demand this as a matter of course.

I am not quite prepared to make the same positive statement in regard to combinations into which a difficult laparotomy enters, although I believe we are rapidly approaching this point, and that further improvements in the technique, including that of laparotomies, will soon enable us, as a rule, to perform at the same sitting all operations, including abdominal section, that may be required in any given case. The Trendelenburg posture has helped us along a great way in this direction.

Perhaps the most frequent, as well as the simplest, of the combinations into which an abdominal section enters is the combination of curettement with salpingo-oöphorectomy for diseased tubes and ovaries. This combination, rationally so often called for by the coexistence and interdependence of endometritis and salpingitis in their various forms, has been quite freely discussed of late, more especially at the meetings of the New York Obstetrical Society. The consensus of opinion among prominent gynecologists is almost unanimous that the two operations are, as a rule, required. The only difference of opinion seems to be as to whether they should be performed at the same sitting, and if so, whether the curettement should precede or follow the salpingo-oöphorectomy. My own rule has been to do the curettement first, even when the presence of pus in the pelvis has been positively diagnosticated, being careful to do the curettement with the uterus *in situ*, *i. e.*, without dragging down the organ.

The abdomen is then opened, the diseased parts removed, and the operation completed by a final irrigation of the uterine cavity with 1 : 2000 sublimate solution, to remove any infectious matter that may have come down from the tubes into the uterus during the manipulations within the abdomen. I have proceeded thus in quite a number of instances and have never had cause to regret doing so. I prefer this order to doing the laparotomy first, closing the abdomen, and taking the chances of internal hemorrhage by slipping of an intra-abdominal ligature during the subsequent curettement.

In addition to the combination of curettement with removal of diseased appendages, I find on my records two cases of fibromata uteri in which I combined curettement with removal of the normal adnexa.

Among the combinations of abdominal sections with other operations, hysterorrhaphy or ventro-fixation of the uterus figures very prominently. I leave out of account here those cases in a which a laparotomy is the only operation performed, and in which, after extirpation of diseased appendages, or removal of a tumor, etc., the uterus is fastened to the anterior abdominal wall in closing the latter.

The most frequent combination of hysterorrhaphy is with curettement. Indeed, I would lay it down as a law that curettement should *always*

precede laparotomy for ventro-fixation of an adherent or non-adherent retroverted uterus, just as it should *invariably* precede shortening of the round ligaments. The condition of the endometrium in retroversion as well as retroflexion always calls for a curettement.

I have on my records two cases in which a badly lacerated cervix coexisted with retroflexion of an adherent uterus, the appendages being apparently normal. In one of them a trachelorrhaphy, in the other an amputation of the cervix, was performed at the same sitting with curettement, severing of adhesions, and hysterorrhaphy.

Prolapse operations. We next come to the important class of plastic operations for prolapsus uteri, partial and complete, into any and every combination of which operations ventro-fixation of the uterus should, as a rule to which there can hardly be an exception, always enter.

I find upon my records notes of nine combined operations for prolapsus uteri, upon eight patients, one of the patients being operated upon twice. In all but one of these cases the prolapsus was complete, forming the so-called procidentia uteri, the uterus and vagina being completely outside of the body between the thighs.

The conditions existing in the case of incomplete prolapsus called for the following combination of operations: Curettement, anterior colporrhaphy, ventro-fixation of uterus and colpo-perineorrhaphy, which were performed at one sitting within the hour, and resulted in a lasting cure of the descensus uteri.

The case of complete prolapsus operated upon twice occurred in a virgin, and was associated with, and due to, tubercular peritonitis with ascites. I have already reported the case in full, in a paper on "Tubal and Peritoneal Tuberculosis," published in the *Transactions of the American Gynecological Society*, 1891, and shall therefore not enter into further details here.

In three cases the complete prolapsus and its associated conditions called for the performance at one sitting of the following operations: Curettement, amputation of the cervix, anterior colporrhaphy, ventro-fixation of the uterus, and perineorrhaphy. In each of the three cases the five operations were performed within seventy-five minutes, and the women all remain cured; the first of the three cases, however, having been operated on only a little over a year ago.

In another case, also of complete prolapsus in a nullipara, I started out to do the same series of five operations just reported upon, but changed my mind during the course of the operation, and performed double lateral colporrhaphy instead of anterior colporrhaphy and colpo-perineorrhaphy, the other operations being the same as in the other three cases. This was my first experience with lateral colporrhaphy, and, owing to this fact probably, the combination demanded one hour and

fifty minutes. The result, however, has been equally as gratifying as in the other cases.

In another case of complete prolapsus, previously operated upon without success by a very distinguished confrère, the following combination, requiring one hour and fifty minutes, succeeded in effecting a cure: Curettement, anterior colporrhaphy, posterior colporrhaphy, perineorrhaphy, and ventro-fixation of the uterus. The changes produced in the various tissues by the unsuccessful previous operations were responsible for the undue length of time required for the successful combination of operations.

Finally, I have to report a failure in combined operations for complete prolapsus uteri. It was my first case, a lady of fifty, and after performing curettement, amputation of the cervix, anterior colporrhaphy, and perineorrhaphy, I proceeded to shorten the round ligaments for the purpose of sustaining the uterus from above. Just here a double mistake was made, which I wish to record for the benefit of those who may not have had a similar experience. The first mistake was to do Alexander's operation for prolapsus. Shortening of the round ligaments is *emphatically* not a proper operation, singly or in combination with other operations, for prolapsus uteri, partial or complete. *The* indications for shortening the round ligaments are given in prolapse of the non-adherent tubes and ovaries, and *par excellence* in retroversion of the non-adherent uterus, the appendages being normal, although perhaps displaced. The second mistake was in expecting to find the round ligaments in a woman who had passed the menopause, after which period in a woman's life the round ligaments atrophy and undergo fatty change with the uterus, only in a more pronounced degree. Of the fifty-one cases in which I have operated for shortening the round ligaments, this is the only one in which I failed to find the ligament, as well as the first and last case in which I attempted to perform the operation in a woman past the menopause. To return, however, to the case—it proved a complete failure. Had I supplemented the plastic operations below by a ventro-fixation of the uterus, I feel confident, from the balance of my experience in this direction, that I would have scored a success.

It is just this—with this one exception—satisfactory and successful experience with plastic operations for the cure of complete prolapsus uteri which compels me to regard total extirpation of the uterus for the cure of prolapsus as uncalled for and unjustifiable under ordinary conditions. By ordinary conditions I mean those in which the prolapsed uterus is neither the seat of a neoplasm, nor, without containing a neoplasm, itself so increased in size that it may not be reduced to about the normal size of the organ by means of an amputation of the cervix. This fact, moreover, must be borne in mind, that in aggravated cases of

complete prolapsus, such as I have reported above, even total hysterectomy is insufficient in itself to cure, but to be efficient must, as a rule, be supplemented by various plastic operations upon the vagina and vulva.

It may be proper to add that the wounds of the various operations entering into combination in the above cases of complete prolapsus all healed by primary union in each instance.

A rather complicated combination of operations I have reported in a case presented to the New York Obstetrical Society. As the case is described in full in the *New York Journal of Gynecology and Obstetrics*, April, 1892, p. 379, I will here only outline it: *Suppurating intra-ligamentary cystoma; unilateral chronic pelvi-peritonitis; secondary salpingitis and appendicitis; extensive laceration of cervix, and of perineum through sphincter. Curettement; trachelorrhaphy; removal of cyst, tube, and appendix vermiformis at one sitting; recovery.* I will merely add that three months later the patient returned for perineorrhaphy for complete tear through sphincter, which operation has been successfully performed. I might cite additional instances of laparotomies for various conditions combined with plastic operations, all successful, were there any special object in doing so.

As regards the mortality of combined operations into which a laparotomy enters, the death-rate will depend to a very great extent upon that of the special intra-abdominal operative interference called for. Thus, when ventro-fixation of the uterus forms the only intra-abdominal procedure, no matter how many simultaneous plastic operations are performed in combination with it, the mortality should be *nil*. It becomes quite a different matter, however, when, for instance, curettement and laparotomy for puerperal pyosalpinx or intra-peritoneal puerperal abscess are called for in the same case. The mortality of the laparotomy then becomes the determining factor, and is, of course, not lessened—nor, in my estimation, increased—by the accompanying curettement. Of the entire number of cases in which the author has performed combined operations he has lost but one, a case of retained secundines, septic endometritis, puerperal pyosalpinx, and intra-peritoneal abscess, *i. e.*, an extreme, almost necessarily fatal case of puerperal sepsis, in which but a week ago I curetted the uterus, removed the pus tubes, and emptied the intra-peritoneal abscess at the same sitting. Had I performed the laparotomy without the curettement, the result would have been the same to the patient; the author's mortality in combined operations, however, would have remained where it was a week ago, *i. e.*, at *nil*.

Lest I may be suspected of never having had a failure in combined operations, I will conclude this paper by reporting *all* the failures, complete and partial, that I have had:

Failure No. 1. A case of retroversion of the adherent uterus, with laceration of the hypertrophied cervix, called for curettement, amputation of the cervix, and ventro-fixation of the uterus. After finishing the curettement, in doing the amputation of the cervix, repeated hemorrhage required the removal and reinsertion of all the cervical sutures three different times in succession. So much time (nearly an hour) was lost in this, and in securing the bleeding vessels, that I considered it imprudent to prolong the anæsthesia sufficiently long to add the laparotomy. The latter was successfully performed two weeks later.

Failure No. 2. Curettement, amputation of the cervix, and shortening of the round ligaments were called for in this case. After performing the two former operations, and isolating and drawing out both round ligaments, the right round ligament in the final pull was torn out of the uterus. Both Alexander wounds were closed, and ventro-fixation of the uterus immediately added. The patient made a good recovery.

Failure No. 3. The same combination, *plus* a perineorrhaphy, was called for as in the case just related. In performing the Alexander the left round ligament was pulled out of the uterus, and, as in the previous instance, ventro-fixation was immediately substituted for shortening of the round ligaments. Uneventful recovery.

These two cases, and the one already reported in this paper, where I failed to find the ligaments in a woman past the menopause, embrace *all* the disagreeable experience which I have had with the operation for shortening the round ligaments.

As in combined gynecological operations the time element is of such great importance, it may be proper to state that wherever the time of an operation has been mentioned in this paper it has always been reckoned from the first incision to the tying of the last suture.

In conclusion, the author would refer to the dearth of literature dealing comprehensively with the subject of combined gynecological operations. The only publication, the title of which indicates an attempt at a systematic treatment of the subject, which he has met with, is a paper by Mundé ("Combined Operations in Gynecology," *New York Medical Journal*, May 18, 1889), the scope of which is, however, more limited than that of the present paper.

SUMMARY.—The tendency of modern gynecology is to progress in a surgical direction.

The uncertainties and unreliability of other methods of treatment as compared with the results obtained by surgical measures are proverbial.

With the rapid strides forward of surgical gynecology, this contrast is daily becoming more accentuated.

Increased confidence in results growing from increased experience and progressive skill will incline the individual operator more and more to trust to surgical resources.

Many cases require more than one gynecological operation to effect a cure.

All gynecological operations required in a given case should at the

present day, as a rule almost without exception, be performed at the same sitting. The patient has a right to expect this from the expert claiming to possess the highest degree of operative skill. That this will be the standard of the near future the author does not doubt.

Success in combined gynecological operations presupposes first of all perfect asepsis and a not too prolonged anæsthesia. The duration of the latter need but very rarely exceed one and a half hours even in the most difficult cases.

Other things necessary are the requisite degree of operative skill and dexterity, sufficient and efficient assistance, a perfected technique of the various operations attempted, and an instrumentarium suitable for rapid work.

Combined gynecological operations may be divided into two general classes:

1. Combinations into which a laparotomy does not enter.
2. Combinations of which a laparotomy forms part.

The expert operator should be able to perform any required combination of operations of the first class within the time-limits of safe anæsthesia.

The same statement holds good of the combinations of operations of the second class into which a *simple* laparotomy enters. When a *difficult* laparotomy forms part of the combination the patient's interests may occasionally be better served by operating at two sittings.

There is no excuse for a mortality in combined operations of the first class. The mortality of combinations into which a laparotomy enters will depend upon that of the special intra-abdominal operative interference required.

A CASE OF CHRONIC INTUSSUSCEPTION OF THE CÆCUM. SPONTANEOUS REDUCTION; RESECTION; RECOVERY.

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Physician to St. Thomas's Hospital,
and
H. H. Clutton, M.D.,
Surgeon to St. Thomas's Hospital.

E. G., aged thirty-two years, farmer, was admitted into St. Thomas's Hospital under Dr. Sharkey's care on January 19, 1892.

He was one of a very stalwart, healthy family, the father, aged eighty-five years, and mother being still alive and well, in addition to nine brothers and three sisters. The patient had not fallen short of the high standard of health which was so marked a characteristic of his family; he had never been ill since childhood, but he had had for ten years a "rupture" on the right side.

About four months ago he began to suffer from aching pains in the abdomen, which came on in paroxysms, and were not localized in any one spot. At first the bowels were constipated, but for the most part they had been loose and irregular, but the evacuations had not been observed to contain either mucus or blood. The abdomen had been liable to distention, and during the attacks it rose, as the patient said, "in lumps." Sickness had been only occasional, and never a prominent symptom in his illness. He had lost weight to the extent of about three stone or more.

On admission he was found to be a finely built man, thin, but with a fairly healthy tint of skin. The organs in general presented no sign of disease. The abdomen was, as a whole, soft and free from tenderness or distention; but in the epigastric and left hypochondriac region a tumor could be felt. It was hardish, smooth, and somewhat movable upward and downward, but not transversely, and it descended to a slight extent with inspiration. It was long, rather sausage-shaped, and extended from the left costal margin, under which it seemed to disappear across the epigastrium, nearly to the margin of the ribs on the right. There was dulness over the tumor, the area of altered percussion resonance being about five inches from left to right, and three inches vertically. There was an interval of resonance between it and the lower border of the liver.

On palpation the mass was tender. As a rule no peristaltic movements were observed, but from time to time, and especially after a meal, some local peristalsis was visible, and an increase in the hardness of the tumor occurred, and its outlines became more distinct.

The case was in some respects peculiar; but, on the whole, it was thought that the presence of a tumor which appeared to occupy the colon, and the rapid emaciation of the patient, pointed to malignant disease of the large bowel.

Treatment consisted in careful dieting, and attempts to relieve the pain, which was greatly increased in paroxysms, by the administration of opium and morphine. But, notwithstanding this, the pain was not very successfully combated, and only short intervals of sleep—about two or two and a half hours—were obtained. The tumor seemed to alter slightly in position from day to day, and to vary in hardness and in definition.

We saw him together in consultation on January 25th, but neither of us was inclined just then to recommend an exploratory operation. At Mr. Clutton's suggestion the patient was treated with ten grains of iodide of potassium, which was soon increased to fifteen and then to twenty grains three times a day.

By this time the bowels had become constipated, and had to be relieved by enema; the action was pale, formed, and contained neither blood nor mucus.

In the next ten days the patient certainly suffered less from pain and slept better, and it was found that he had not lost weight (eight stone thirteen pounds).

On February 8th, for the first time, a little mucus was seen in the stools.

On February 15th the patient expressed himself as feeling quite well and free from pain. Except for a short time after defecation, he had slept well without morphine. The rectum, on examination, proved to

be normal. His motions were formed. No great alteration had occurred in the tumor.

On February 18th the patient was seized with great pain in the abdomen, and about an hour afterward he vomited three pints of fluid, and had diarrhœa, the motions being dark and liquid, and containing neither blood nor mucus. Next morning the tumor was found to have disappeared from the position it had occupied, and the patient no longer had pain or tenderness there.

When Dr. Sharkey saw him on the afternoon of the 19th he confirmed this observation, but found a tumor of similar shape, but somewhat smaller size, lying obliquely in the right iliac fossa. The patient had put on several pounds in weight. The change of position in the tumor naturally suggested intussusception, and the supposition was that the intussusceptum had passed again out of the intussuscipiens, as far as the ileo-colic region, and that probably some tumor of the bowel was the cause of the intussusception. We again saw the patient together, and determined that an exploratory operation should be performed. This was done on the afternoon of the 20th.

February 20th. With the assistance of Messrs. Wyman and Harper, the house surgeons, Mr. Clutton opened the abdomen in the middle line, and soon found a mass lying in the right lumbar region which proved to be the cæcum. This was so movable that it was easily brought through the wound on to the abdominal parietes. It was intensely congested, rough on the surface, and felt firm and solid. As this condition was attributed to a tumor within the bowel, the cæcum, a few inches of the colon, and adjoining portion of the ileum were removed. After the bleeding from the mesentery, which was very troublesome, had been arrested, the free ends of the large and small intestine were closed by a continuous silk suture passed only through the serous and muscular coats so as to invert the mucous membrane. Senn's plates were then introduced through an incision one inch in length, made about two inches from the free extremities of both the ileum and the colon, opposite to the attachment of the mesentery. The polished surface of the ileum was scratched with a fine needle to promote plastic exudation, but the colon was already rough and vascular. The two portions of the bowel were then approximated, so that both free ends should present toward the groin. There was a good deal of traction necessary to bring the opposing surfaces evenly together. It was therefore thought desirable, after the sutures belonging to the plates had been tied, to further support them in their position by a continuous silk suture through the serous and muscular coats along the margins of the plates. After careful washing, the parts were replaced within the abdomen, and a small opening made through the parietes, over the right iliac fossa. A glass drainage-tube was introduced through this opening for fear of any extravasation, and the median incision closed with silkworm-gut sutures. There was never any discharge from this tube, and it was removed on the 24th. He had no pain or sickness after the operation, and his temperature remained normal. The morphine which he had previously been taking was gradually reduced and finally omitted altogether. His bowels acted naturally on the 28th, and subsequently without any trouble. The right scrotal hernia which he had had for some years began to be painful and swollen on the 29th, but as he had no symptoms which could be attributed to strangulation or obstruction, it

was thought probable that this was simple inflammation of the sac by extension. It was fluctuating and dull on percussion. On March 14th, as it was still painful and the skin becoming red it was incised under an anæsthetic. Pus and a small slough, which was probably the remains of a piece of omentum, were evacuated. The sac was scraped and washed out, and a drainage-tube inserted for twenty-four hours. The wound quickly healed, and as the inguinal canal was firmly closed, a radical cure may be expected.

On April 9th he left the hospital perfectly well, having gained between two and three stone in weight since the intestinal resection on February 20th.

Examination of the parts removed. Glands were found in the mesentery which were enlarged but apparently not the seat of new growth, and those which were attached to the parts which had been removed were found, on section, to be free from new growth, although increased in size.

On opening the cæcum, what appeared to be a tumor about as large as a walnut was seen projecting from the wall of the bowel, just to the right of the ileo-cæcal valve. The latter, although a little swollen, was not involved in the disease. The surface of the mass passed gradually into the normal mucous membrane around, and appeared to be formed itself of mucous membrane somewhat altered, and in the centre of the tumor superficially eroded. On making a section vertically through the mass, it was seen that the mucous membrane on its circumferential parts was somewhat thickened, whilst that in the centre was thinned. There was great thickening of the submucous and muscular coat, and a coarse striation perpendicular to the surface. The greater part of the firm mass felt before the cæcum was opened consisted of very œdematous tissues outside the bowel which, together with the mass described, were slightly inverted, and so seemed to fill the bowel. It was hard, if not impossible, to get these parts to keep their position when pushed outward, and they quickly again returned to the inverted position from which they had been displaced.

On subsequent microscopic examination of the supposed tumor, it was found that no new growth was present in it except new growth of connective tissue. In fact, a chronic inflammatory thickening was the pathological change which had occurred. This was present principally in the submucous coat of the bowel. The vessels there were very large and prominent objects, and their direction was mainly vertical to the surface of the gut. Considerable quantities of softish connective tissue surrounded them, and here and there were large accumulations of granular blood pigment, the relics of former hemorrhage. The columnar cells of the bowel were distended with mucus, but there was no other abnormal feature observable in them.

Medically and pathologically, the principal points of interest in the case are:

1. Its insidious onset and long duration.
2. The absence of blood and mucus from the stools.
3. The very rapid emaciation.
4. The spontaneous reduction of the intussusception.
5. The great size and hardness of the cæcum, which gave rise to the conclusion that a tumor occupied its interior.
6. The point of origin of the intussusception, viz., the cul-de-sac of the cæcum.

The symptoms and course of chronic intussusception are often quite obscure, and present few, if any, of the distinguishing characters of the acute cases. The emaciation, however, in this case was exceptionally rapid. It is very likely that commencing intussusceptions may sometimes be spontaneously reduced, but clinically little is known for certain on this point; it is rather a matter for conjecture. Here, however, the symptoms during the long illness, the sudden displacement of the swelling from the left hypochondrium to the right lumbar region, the great injection and roughness of the external surface of the cæcum, and the clear evidence on examination after excision of intussusception, great swelling, and œdema of this portion of the bowel, together prove that spontaneous liberation of the involved gut did suddenly occur in this case after weeks, if not months, of incarceration.

We know but little of the immediate cause of intussusception in general, and this case throws no light upon the subject, if, indeed, it does not further obscure it. For it is hard to see why the wall of a cul-de-sac like the cæcum should be the starting-point of such an accident when everything around, including the vermiform appendix, appeared to be normal.

So far as the operation itself is concerned there is little to add. The manipulation was easier than it is likely to be in any case of malignant disease, except, possibly, in its earliest stage. The whole cæcum could be brought through a median abdominal incision. This was, no doubt, due to the fact that it had been stripped up from the surrounding tissues by the intussusception, and that there was no infiltration outside the intestinal wall. An end-to-end reunion would have been very difficult on account of the difference in size of the two segments, whereas the method adopted of closing the two ends and inserting a bone plate in each was rapid and efficient.

MID-SYSTOLIC AND LATE-SYSTOLIC MITRAL MURMURS.[1]

By J. P. Crozer Griffith, M.D.,
Professor of Clinical Medicine in the Philadelphia Polyclinic; Clinical Professor of the Diseases of Children in the University of Pennsylvania.

By mid-systolic and late-systolic murmurs are here designated those which possess the area of diffusion of the ordinary murmur of mitral insufficiency, and which are attended by the ordinary symptoms of the disease, but which occupy only the middle or latter portion of the period between the apex beat of the heart and the second sound, leaving the first portion unaffected.

The details of three cases which have come under my observation will, perhaps, best describe the nature of this condition.

Case I.—Emma G., aged twenty years; married; mill-operative. Her mother had suffered from rheumatism, and she herself had had measles, diphtheria, and typhoid fever when a small child. In 1879 she experienced her first attack of rheumatism, and as soon as she recovered from it began to suffer from palpitation, dyspnœa, and swelling of the feet. Her general health, however, was good, and she was able to work. In February, 1888, she came to the hospital of the University of Pennsylvania, where I first saw her. At this time she was suffering from pain over the heart, swelling of the feet, dyspnœa on exertion, and palpitation. Physical examination revealed a loud, high-pitched, and very musical murmur in the region of the apex. The first sound was distinctly heard; then, after a slight interval, came the murmur referred to, and then, after a pause about as long as the first, the second sound. Both first and second sounds were entirely free from murmur. Exact records of the area of diffusion of the murmur and the character of the sounds elsewhere were not made at this time, but it was carefully observed that the character of the murmur was entirely that of mitral insufficiency, though its time was purely *mid-systolic* (Fig. 1), and that there was no evidence of disease of any other valve than the mitral.

Fig. 1.

Emma G., Feb., 1888. Mid-systolic murmur.

On May 28, 1888, the following note was made: "Under the use of digitalis, cod-liver oil, and iron she has improved greatly, and her heart has given her less trouble than for a long time before. At present the pulse is rather short and hard. No murmur can be heard. Both pulmonary and aortic second sounds are accentuated."

[1] Read before the Association of American Physicians, at Washington, May, 1892.

During the spring of 1888 she passed through a second attack of inflammatory rheumatism, though not of great severity.

Through the summer of 1888 her health was excellent. About the first of November, 1888, she exhibited the early symptoms of typhoid fever, and entered the hospital of the University on the 11th of the month, coming under my care. The record at this date reads: "She has been suffering from palpitation. After rest in bed for some hours, and while still recumbent, examination shows the apex beat to be in the fourth interspace. The cardiac dulness is bounded by the third rib, the left border of the sternum and the nipple line. Possibly a slight systolic murmur can be heard over the præcordium. The sounds are normal at the aortic cartilage at the apex and in the axilla, but the second sound is slightly accentuated over the pulmonary cartilage, the sternum, and the xyphoid cartilage."

The disease ran a favorable course, though complicated by a slight phlebitis. While still in bed, on December 3d, there was noted "a faint systolic murmur at the apex, transmitted horizontally outward for about two inches, not heard elsewhere. The aortic second sound ringing; the pulmonary second sound accentuated. Apex beat in the fourth interspace."

On December 18th, the following record was made: "A high-pitched musical murmur, rather closely following the apex beat but not replacing the first sound, is heard at the apex and very faintly in the axilla; but its maximum intensity is just to the left of the xyphoid cartilage. The pulmonary second sound is accentuated."

On December 27th is recorded: "An almost imperceptible systolic murmur, frequently not heard at all. Occasionally the murmur is musical, and seems to be influenced by respiration. The patient is still in bed."

Shortly after this time the patient was out of bed and about the ward, and the following note was made on January 17, 1889: "A peculiar, short, high-pitched, creaking systolic murmur is audible over the whole cardiac region, but loudest near the apex. It comes somewhat after the apex beat, and both the first and second sounds can be distinctly heard."

The patient soon left the hospital, and was not seen again until October 10, 1889. She had been suffering from no cardiac symptoms until shortly before. She now complained of debility, some uterine disturbance, palpitation, and swelling of the hands. The same mid-systolic murmur was audible as on some previous occasions.

She was seen several times up to December 21, 1889, but in spite of treatment her symptoms were not materially altered, and "the same musical murmur" is recorded.

She was not examined again until September 23, 1890. At this time she was in about the fourth month of pregnancy. She complained of swelling of the feet, headache, and leucorrhœa. The record made at this date is as follows: "At the second right costal cartilage both sounds are clear. At the second left cartilage the second sound is decidedly accentuated. Down the sternum both sounds are loud and clear. At the apex is a low-pitched murmur coming just after the apex beat. It has not the distinctive character of the mid-systolic murmur as heard at the first examination of the patient, though it still begins slightly later than an ordinary mitral regurgitant murmur (Fig. 2). The murmur is faintly

musical and is audible in the axilla and to about midway between the apex and the xyphoid cartilage. It is not heard in the back or in the vessels of the neck. The cardiac dulness extends from the third rib to just to the left of the mid-sternal line and to a little outside of the nipple line. The apex beat is in the fourth interspace slightly beyond the

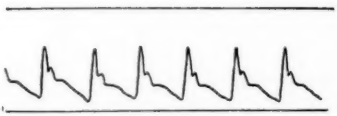
FIG. 2.

Emma G., Sept, 23, 1890. Rhythm nearly that of ordinary mitral regurgitation.

nipple. The horizontal diameter of the cardiac dulness equals 4½ inches." A sphygmographic tracing of the radial pulse was taken on this date (Fig. 3).

The patient was examined for the last time toward the close of February, 1891, being now very near the full term of pregnancy.

FIG. 3.



Emma G. Pulse-tracing Sept. 23, 1890.

A slightly musical murmur, distinctly after the first sound, was heard loudest at the apex and transmitted into the axilla. It was faintly audible everywhere over the heart. It approached the character of that heard in February, 1888, but was not separated from the apex beat by quite so long an interval.

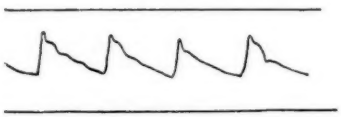
CASE II.—The following interesting case of late-systolic mitral murmur was first observed in the medical dispensary of the University of Pennsylvania by Dr. J. H. Fussell, through whose kindness I am enabled to report it. Considerable discussion at first arose among those who examined the patient, regarding the nature of the lesion and of the murmur. Eventually all agreed that he certainly presented a mitral regurgitant murmur of a very peculiar type. I finally made a careful study of the heart sounds and recorded the following notes:

"March 17, 1890. John McG., aged seventy-two, married. He has at times had to work rather hard and to do some heavy lifting. With the exception of occasional slight dyspnœa, he appears to have been well until the age of twenty-five years. At that time he was confined to bed for three or four weeks with shortness of breath. As he recovered and got about again he found that his feet and legs often became swollen. He gives no distinct history of any attack of rheumatism, but says that he has at times had pain in his arms and oppression across the chest; the result, he supposed, of his heavy work. He appears to have recovered completely from the severe illness mentioned and to have been in good health for years. About five or six years ago, however, he began to

notice that in walking up a long and steep hill on his return from his day's work he would experience a dull pain over the chest, with shortness of breath and palpitation of the heart. These symptoms troubled him to such an extent that he would be obliged to rest several times on the way up the hill. As soon as he reached the level ground the sensations left him. At the same period he observed swelling of the feet. All his symptoms gradually grew worse, and at the present time he has swelling of the feet nearly constantly, and often has palpitation even when at rest. He suffers from dyspnœa on exercise, but is able to sleep prone. He has a slight cough and considerable headache. He has had no dyspnœa for some time and has never had hæmorrhoids. Two years ago he was operated upon for hydrocele.

"Examination shows him to be without anæmia, emaciation, arcus senilis, or pulsation or murmur in the vessels of the neck. There are no abnormal physical signs to be noted in the lungs. The urine is normal. The artery at the wrist is not notably atheromatous and shows neither increase of tension nor the trip-hammer pulse. The sphygmographic

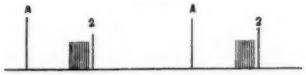
FIG. 4.



John McG. Pulse-tracing March 17, 1890.

tracing confirms the evidence given to the fingers (Fig. 4). The apex beat can be felt very indistinctly in the fifth interspace within the nipple line. No præcordial thrill can be perceived. The cardiac dulness extends from the fourth rib to the right edge of the sternum, and thence transversely to the left to a little beyond the nipple line. At the apex there is a clear first sound. The latter portion, rather less than one-half, of the systolic period is occupied by a high-pitched murmur, which continues almost to the second sound, ending so immediately before it, that it at first seems almost actually to run into it (Fig. 5).

FIG. 5.

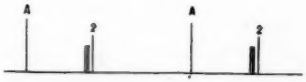


John McG., March 17, 1890. Late-systolic murmur.

The second sound is, however, clear and unaffected by the murmur. The murmur is heard very distinctly in the axilla, and the second sound is a little accentuated there. Over the base the same murmur is audible, though not so loud. At the aortic cartilage no murmur can be heard and the second sound is slightly ringing. The second sound is quite loud down the sternum and no murmur can be heard there. At the xyphoid cartilage the murmur is very faintly audible, while at the pulmonary cartilage there is neither murmur nor accentuation of the second sound."

The patient was examined repeatedly after this date before the ward class at the University Hospital. At every examination the same characteristic murmur could be heard. On some occasions, however, it was so short and so close to the second sound (Fig. 6), that it was difficult to determine whether or not it was synchronous with it. Nevertheless, careful auscultation, with simultaneous timing of the apex beat

FIG. 6.



John McG. Several occasions after date of Sept. 5th. Late-systolic murmur.

or of the vessels of the neck, invariably showed that it both began and ceased before the second sound occurred. In no instance could a murmur be heard with the second sound, nor could any be at any time discovered at the aortic cartilage or elsewhere than as described. The man continued to exhibit the symptoms of mitral regurgitation.

CASE III.—The third case, which might even be viewed as a combination of mid- and late-systolic murmur, was seen at my clinic at the Philadelphia Polyclinic during the present year, and the following notes were made:

"April 7, 1892. Sarah J. N., aged forty-seven years, married; has had eight children. She has always enjoyed good health, except for 'typhoid malaria' and for influenza, occurring respectively eleven and two years previously. One year ago she began to suffer from pain in the lumbar region which prevented stooping, and from pain in both lower extremities which extended from the hip to the knees, both in front and behind. There has been no swelling or pain of any joints or any complaint of local tenderness. The pain is not constant and is worse in damp weather. For two months it has been getting much worse than ever before, and now is so severe at night that she is scarcely able to sleep. She says that she has no palpitation or dyspnœa except on violent exertion, and to no greater degree than a healthy person would experience under similar conditions. Examination discloses no swellings or painful points. The chest is well formed; the mammæ are quite large and obstruct the inspection of the præcordium. The apex beat is indistinctly felt in the fifth interspace within the nipple line. The cardiac dulness is bounded by the third rib and the mid-sternal line. The left border appears to be the nipple line, but the size of the breast interferes with its exact determination. There is no thrill. At the apex the first sound is rather booming and the first portion of the systolic period is unattended by any murmur. At the end of the first third, or perhaps the first half, of the period between the apex beat and the second sound there begins a rather high-pitched, slightly musical murmur, running up to but not replacing the second sound, which is heard distinctly here (Fig. 7). The same murmur, though less loud, and the unaffected first and second sounds are audible at the xyphoid cartilage. Over the base of the heart and of the middle of the sternum the sounds and the murmur are still less distinct. In the axilla the first and second sounds are quite audible and are clear, and there is a loud murmur of the same character as described. The murmur

and sounds are heard very indistinctly at the angle of the scapula. At the aortic cartilage there is a faint first sound, followed by a very faint murmur of the quality and time already described. The second sound is very faint. At the pulmonary cartilage the murmur is faint, and the

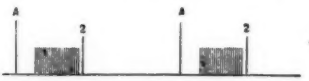
FIG. 7.

Sarah J. N., April 7, 1892. Combined mid- and late-systolic murmur.

first and second sounds are likewise faint, though a little louder than at the aortic cartilage. The maximum intensity of the murmur is clearly in the mitral area."

On April 9th the patient was seen again. On this occasion the heart's action was very irregular, and on the slightest exertion, and indeed for the greater part of the time during which the examination was being conducted, presented a condition of which the following note was made:

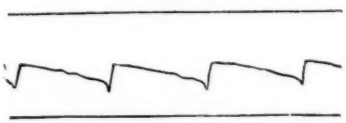
FIG. 8.



Sarah J. N., April 9, 1892. Bigeminal and alternating cardiac action. Murmur practically the ordinary mitral regurgitant.

"The apex beat is very closely followed by the murmur, with an interval very short compared with the condition heard two days ago. The interval is, in fact, so brief that the peculiarity of the murmur could easily be overlooked (Fig. 8). The whole of the systolic period is short, and the murmur is closely followed by a faint but clear second sound. After a short diastole another apex beat occurs which is not attended or followed by any murmur whatever, and after which no second sound can be

FIG. 9.

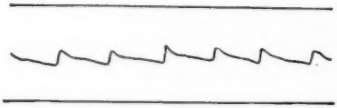


Sarah J. N., April 9, 1892. Pulse-beats only one-half as numerous as the ventricular contractions. Murmur that of Fig. 8.

heard. The combined time of the second systole and diastole is decidedly longer than the first cardiac cycle. The third cycle resembles the first and the fourth the second. Thus the cardiac rhythm is both bigeminal and alternating, every other ventricular contraction being only sufficient to raise the aortic leaflets a very little, as shown by the alternating pulse in the vessels of the neck; but not sufficient to produce any effect in the artery at the wrists, as the sphygmographic tracing shows" (Fig. 9).

After the patient had been at perfect rest for about a half-hour she was reëxamined and the following condition recorded: "The murmur at the apex is similar to that heard two days ago, except that the interval from the apex beat to the beginning of the murmur is perhaps a little shorter." A sphygmographic tracing was taken while the heart was exhibiting this rhythm (Fig. 10).

FIG. 10.



Sarah J. N., April 9, 1892. Taken when heart exhibited a murmur nearly similar to that of Fig. 7.

The form of murmur just described is certainly very unusual. I have unfortunately not been able to make an extended search through the literature of the subject, but such as I could achieve reveals only occasional and indefinite references to it. I find it alluded to under the title of "post-systolic" murmur, a name which involves, I think, a misconception of its nature and cause. Gemmill[1] merely refers to the term as being employed by Walshe, Hayden, and others. Walshe,[2] however, simply refers to the existence of a post-systolic murmur, but, so far as I can find, gives no description whatever of it, nor explains how it is produced. It is true that he describes a murmur heard at the *base*, which is abruptly terminated by the second sound, but which he still calls diastolic, and concerning the method of production of which he seems to be uncertain. Hayden[3] report five instances of "post-systolic" murmur—by which term he designates a murmur occupying the short silence. Only one of these did the author regard as mitral in origin. Bristowe[4] speaks of hæmic murmurs which sometimes occupy only the latter part of the systolic period, and, increasing in force, run into the second sound. They are generally best heard at the junction of the third left costal cartilage with the sternum. These murmurs are not at all similar, therefore, to those now described, and need not be further considered.

The term "post-systolic" could apply to no murmur whatever, except on the theory that the systole of the ventricle lasted only until the beginning of the short silence, and that this silence corresponded to the relaxation of the ventricles and the time supposed to be required for the aortic valve to close. Did this theory represent truly the physiological cardiac rhythm, a murmur heard just before the second sound would be, of course, post-systolic. My own feeling, based only on clinical

[1] Clinical Diagnosis, Finlayson, 1886.
[2] Diseases of the Heart, 1862.
[3] Diseases of the Heart and Aorta, 1875.
[4] Lancet, 1887, ii. 952.

deductions, and without reference to physiological data, had long been that there existed no pause between the relaxation of the ventricle and the closure of the aortic leaflets long enough to allow of the production of a discernible murmur; *i. e.*, that the closure of the valve was practically simultaneous with the beginning of ventricular relaxation. According to this view the systole begins with the apex beat and lasts to the second sound. This division of the cardiac cycle is, indeed, the one usually accepted, and is that advocated years ago by Volkmann and Donders, who taught that the cessation of contraction of the ventricle and of the streaming of blood into the aorta, the closure of the semilunar valve, and the occurrence of the second sound were simultaneous. Later studies with the cardiograph, however, led various investigators to adopt views differing from this; Landois, Edgren, and others placing the second sound after the commencement of the diastolic period. According to these views, and, indeed, according to the scheme for the cardiac cycle as proposed by Volkmann and Donders, it is necessary to admit of the existence of a physiological aortic regurgitation, produced by the blood, in its recoil upon the aortic leaflets, passing backwards through the orifice in the process of rapidly closing it. Such an assumption as this seems contrary to the perfection which we have learned to expect in Nature's apparatus. Yet it is evident that if relaxation of the ventricle begins where the aortic valve is widely open, the leaflets cannot be forced together without blood regurgitating at the same time.

The recent careful experiments of Martius,[1] and his exhaustive critical review of the whole matter have thrown great light upon the subject. Martius shows that there is nothing which justifies the assumption of the physiological aortic insufficiency. He claims that after the blood has been expelled from the ventricle into the aorta there is a short period, a "persistence time" (Verharrungszeit), in which the ventricle simply maintains its contracted state. During this time, as Ceradini proved years ago by careful experiments, the semilunar leaflets become closely approximated by a reverse whirl of the blood in the aorta; so that the recoil, when it does come with the first relaxation of the ventricle, finds them in perfect apposition and simply puts them suddenly on the stretch, thus producing the second sound. The existence of this "persistence time" is necessary in order to permit of closure without regurgitation.

This theory, so well sustained by Ceradini's experiments and by Martius's studies of cardiographic tracings, makes the second sound mark the beginning of diastole and the end of systole. It renders absolutely impossible the existence of a murmur just before the second sound, due,

[1] Zeitschr. f. klin. Med., xix. H. 1 u. 2.

as Skoda and others after him maintained, to the friction of the blood on the roughened aortic walls during its recoil upon a competent aortic valve. For the same reason, *i. e.*, that the systole lasts quite to the second sound, the late-systolic murmur cannot be accounted for by supposing that a partial aortic regurgitation is taking place; the imperfect valves still closing and producing the second sound: for such a murmur would be diastolic in time.

Still another explanation has been advanced for late-systolic murmurs, viz., that regurgitation through a diseased aortic orifice takes place, producing the murmur, and that the pulmonary valve closed a little later than this in time, thus producing the second sound. But this explanation is not very satisfactory, and could by no means apply to cases in which the murmur has the area of diffusion of mitral regurgitation.

Adopting the view that the second sound marks the beginning of diastole, murmurs heard before it must, of course, be systolic. The cases here reported are all instances of systolic murmur heard in the mitral area, and can, with good reason, be regarded as cases of mitral regurgitation. The first two cases not only exhibit the physical signs but the constitutional symptoms of this affection; while the third case, though possessing no subjective symptoms, shows the characteristic area of diffusion, enlargement of the right ventricle, and slight accentuation of the pulmonary second sound; and I unhesitatingly regarded it when seen as an instance of mitral insufficiency. Case I. is an interesting example of what I have called "mid-systolic mitral murmur;" analogous to the mid-diastolic mitral murmur of Bristowe.[1] Case III., and especially Case II., are interesting in that they offer clinical proof of the view that the systole lasts quite up to the second sound. The murmur in Case II. ran up so close to the second sound that it at first seemed to replace it. This fact is clinical evidence also that the "persistence time" of Martius must be of exceedingly short duration, as, indeed, the author admits. The very short interval which occurs between the two parts of a double aortic murmur is similar proof of the briefness of this period.

The method of production of mid- and late-systolic murmurs admits of different explanations. If the murmur be at the aortic cartilage an obstructive lesion of the aorta must be presupposed. If it be basic it may be a hæmic murmur, of which the mode of production is not understood. If it be at the apex and with the diffusion of a mitral regurgitant murmur, the existence of insufficiency of the mitral valve may reasonably be assumed. The regurgitation in some such cases might depend on no actual valvular lesion. Relaxation of the walls of the ventricle or of the papillary muscles might allow of some slight regurgitation

[1] Lancet, 1887, ii.

during a portion of the systolic period. It seems much more probable, however, that cases such as those reported are instances of mitral regurgitation of a much greater degree than the murmur alone would indicate. The changes which were noticed at different examinations arouse the suspicion that there existed in all three cases a systolic murmur exactly analogous to the "potential" presystolic murmur described by Bristowe,[1] in which the murmurs heard at different times were but "fitful and accidental roarings of one continuous torrent." The regurgitation, then, in these three cases probably lasted through all, or nearly all, of the systolic period, but usually became audible, for unknown reasons, only towards the middle or latter portion of it.

A CASE OF SCLERODERMA WITH UNILATERAL FACIAL MUSCULAR ATROPHY.

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The following case differs in several respects from many that have been called scleroderma, but coincides with many others in essential points. It presents features which have hitherto not been frequently described in this disease, and which may serve to throw some light on its complicated nature. The patient came under my observation at the San Francisco Polyclinic last May, and I have profited by the remarks of Dr. D. W. Montgomery, one of the dermatologists to that institution.

Personal history. J. R., a native of Ireland, aged twenty-four years, had always been well with the exception of an attack of pleurisy on the left side contracted about five years ago, until his present complaint began in 1888. At the time of Riel's rebellion in Canada, after having been subjected to a physical examination, he was received as a volunteer in a regiment of fusiliers, but did not see active service. Has never had any venereal disease. About three years ago the patient began to be troubled with cramps in the right thumb and in the left thigh. Such cramps are still a source of considerable discomfort; they occur now most frequently in the right arm and thigh, and in the back of the neck. Simultaneously with the cramps an alteration in the appearance of the skin was noticed; the patient is unable to say that either phenomenon preceded the other. He describes the progress of the affection substantially as follows: It began in the right first interosseal space and spread up the flexor surface of the right arm, and in a few days extended as high as the right pectoral muscle. The next patch came over the apex of Scarpa's triangle on the left leg, and extended down the inner side to below the knee, then continued down the outer side of the leg and foot to the toes. It progressed thus far in about two months. Two spots then appeared, one to the right of the median line on the margin of the

[1] Loc. cit.

ribs, the other in the line of the nipple over the liver. Subsequently the outer surface of the upper third of the right thigh became involved. The disease generally began by an irregular pigmentation and glossiness of the skin, with some itching of the parts affected. There is a sensation of coldness wherever the skin of the limbs is involved, and the patient frequently rubs the affected parts to rid himself of the frosty feeling. Cramps have never occurred in the face, but about two years ago it was noticed that the left half of the lower lip was wasting, and the patient found difficulty in whistling. Inquiries concerning the family history elicited no available results.

Present condition. The patient is a tall, well-built young man. The face is rather emaciated, the masseters very prominent; weight, 126

FIG. 1.

Showing atrophy of left leg.

pounds. (A photograph taken five years ago shows a much better state of general nutrition; the weight then was 145 pounds.) The difference in circumference of the extremities is apparent at a glance, especially in the lower limbs (Fig. 1). The following measurements were taken:

Right thigh, in the middle	43 cms.
Left thigh, in the middle	36 "
Right thigh, above patella	31 "
Left thigh, above patella	28 "
Right leg, greatest circumference	31.5 "
Left leg, greatest circumference	27 "
Right leg, at ankle	21.5 "
Left leg, at ankle	19.5 "
Right forearm, middle	23 "
Left forearm, middle	24.5 "
Right arm	23 "
Left arm	24 "

The right thumb at the first phalanx is fully one-half centimetre thinner than the left, and the bone has evidently participated in the atrophy; the thumb-nail is narrower than on the other hand, and shows very pronounced longitudinal cracking.

In addition to the description of the extent given in the personal history, it may be mentioned that of late the affection of the skin has extended further in the interscapular space and on the back of the neck, and that one patch has just appeared on the lower part of the left side of the abdomen, and another on the anterior surface of the right thigh. By way of general characterization, the patches may all be described as scar-like, erythematous, pigmented, glossy, and attached to the subjacent structures; but all these characteristics are present in vastly different proportions in the individual lesions. The pigmentation and glossiness, as a rule, grow deeper with age. The skin on the left forearm has at one place a mottled appearance, caused by very small, round spots which are slightly below the level of the normal skin, have a bluish color, and tend to coalesce. Some of these spots are still visible on the right forearm, and to the union of such is probably due the present smooth and glossy appearance of the tightly drawn skin of that member. There is a somewhat indurated patch over the right biceps muscle, which cannot be raised in a narrow fold, but, when raised in a broad fold, feels like a tendon. One spot over the inner end of the right clavicle looks strikingly like a superficial scar with dilated capillaries; there are similar spots elsewhere. In some places the pigmentation looks as if the skin had been dusted with brownish dust, leaving minute patches of very white skin shining through the dirt. The deepest pigmentation is over the right thigh. On the left lower limb the subcutaneous fat seems to have entirely disappeared, leaving the muscles standing out with the skin drawn more or less tightly over them. The same pertains in a less degree to the right upper extremity. On the left leg the tightening is of such an extent as to interfere with dorsal flexion of the foot. Here the glossiness of the skin is partly due to the tightening and consequent obliteration of the fine markings, and partly to the absence of hair. The absence of hair is particularly noticeable over the shin-bone, the few remaining hairs being very atrophic. The veins are unusually distinct on the left leg, especially on the outer side and over the patella; they are not varicose. It must be added that the patient has naturally a light, clear skin. The pigment is normal brown on genitals and nipples. It is worthy of note that the aspect of the diseased skin varies at times; on some days it appears lighter in color and less tight than on others. Such variations have also been noticed by Senator in a case published in the *Berliner klin. Wochenschrift*, 1884.

Perspiration is abolished in those parts where the disease has made much progress.

The *temperature*, as indicated by the surface-thermometer, is somewhat lower in the affected parts than in the corresponding normal skin: thus, on the left thigh (diseased), 89.5° F.; corresponding part of right thigh (normal), 90.5° F.; a difference in the same sense exists on the legs below the knees.

Sensibility in all its qualities is normal.

Reflexes: Knee-jerks somewhat exaggerated, more so on the right than on the left side; tendo Achillis reflex active on both sides, no clonus.

Plantar reflexes very faint. Cremasteric and epigastric reflexes, as well as those of the upper extremities, normal.

Motor functions in all the limbs are perfect, only the left foot and the right thumb being impeded a little in certain movements by the condition of the skin.

Cramps occur only where the overlying skin is affected; these cramps are tonic contractions, not painful; they occur chiefly in the first interosseal muscle of the right hand, the pronator muscles of the right forearm, the recti femoris, and occasionally in the left calf, the muscles of the abdomen, the back of the neck, and the right shoulder. When the patient forcibly flexes the right forearm or extends the left he is not able to overcome the contraction of the flexor or extensor muscles at once, but these muscles remain contracted a short time against his will. The skin over the left triceps is affected. There is considerable atrophy of the muscles of the right upper and the left lower extremities, and to this is partly due the marked diminution of the volume of these limbs.

The direct and indirect faradic and galvanic reactions, however, are normal. The following numbers were obtained with Hirschmann's absolute galvanometer:

	Dext.	Sin.
N. ulnaris . .	1.0 milliampères	1.0 milliampères
N. medianus . .	1.3 "	1.2 "
N. radialis . .	2.0 "	2.4 "
N. cruralis . .	2.1 "	2.2 "
N. peroneus . .	0.9 "	0.9 "
N. tibialis . .	1.5 "	1.6 "
N. accessorius . .	1.2 "	1.2 "

Both bicipites brachii contract at 1 milliampère, and the vasti interni at 1.7 milliampères. The mechanical excitability of the muscles seems somewhat increased, especially that of the vasti interni and the infraspinati. If a faradic current of moderate strength be applied to the right median nerve the muscles supplied by that nerve remain contracted for some time after the electrodes have been removed; the same occurs in the right biceps when that muscle is contracted by excitation of the musculo-cutaneous nerve. Erb says (*Electro-therapie*, 1886, p. 180) that this may happen in otherwise healthy individuals; the cause is not known, but it seems to be the result of some morbid change in the muscular substance.

The *electrical resistance* of the skin has been stated by Erben (*Vierteljahresschrift f. Dermat. u. Syph.*, 1888) to be diminished in scleroderma. The same fact was casually observed by Bernhardt and Schwabach in 1875 (*Berliner klinische Wochenschrift*, 1875). I determined the relative minimum resistance (for 10 Leclanché elements) on corresponding parts of the thighs, non-polarizable electrodes being used. The relative minimum resistance on the (diseased) left thigh is 1680 ohms; on the corresponding part of the (normal) right thigh, 2800 ohms—which corroborates Erben's statement. In the diseased locality the minimum of resistance was attained much more rapidly than in the normal.

The *skin of the face* is perfectly normal. Here, however, a different affection is met with. The atrophy of the left half of the lower lip is conspicuous; while the right half presents no morbid change, the left is thin, does not suffice to close the mouth, and permits of one or two teeth being seen. The speech is clear and distinct, but pronunciation of the

labial consonants produces a contraction of the orbicularis oris inferior only on one side. The degree of functional disturbance becomes still more evident when the patient purses his mouth to whistle (Fig. 2). No other incongruity between the two halves of the face is ordinarily visible; functional and electric tests, however, reveal that the disease is not limited to the orbicularis oris. An attempt to perform the act popularly known as "turning up one's nose" produces a contraction of the nasal muscles on the right side only. During forced inspiration the left ala nasi is less active than the right. The patient can close both eyes simultaneously, but it is noticeable that the left orbicularis palpebra

FIG. 2.

Attempt to whistle.

does not contract as forcibly as the other. Moreover, the patient himself called attention to his inability to close the left eye by itself, the right one remaining open: he is very positive in his assertion that this difficulty did not exist a few years ago, for he was accustomed to close the left eye while practising with the rifle in his volunteer days. He has no difficulty in closing the right eye alone. He is able to frown, to pucker his eyebrows, wrinkle the forehead, draw out the corners of the mouth, and inflate the cheeks when the air is prevented from escaping through the left corner of the mouth. The masseters, pterygoid, and chin muscles act well.

The following numbers denote the intensity of current required to produce a minimum contraction: Right superior branch of facial nerve, 1.1 milliampères; left superior branch, 1.3 milliampères; right middle branch, 1.2 milliampères; right inferior branch, 1.3 milliampères. Excitation of the left middle branch produces a contraction in the orbicularis oris superior at 2.2 milliampères, but none in the nasal muscles at 14 milliampères. In the left inferior branch 1.9 milliampères produced a weak contraction in some chin muscles, but 4 milliampères had no effect on the orbicularis oris inferior. On direct application of the electrodes, both frontal muscles contracted at 1.6 milliampères, and the right and left orbicularis palpebræ contracted at 1.5 milliampères and 1.7

milliampères, respectively; the right orbicularis oris inferior at 1.7 milliampères; the left orbicularis inferior at 6 milliampères; the right quadratus menti at 1.8 milliampères; the left quadratus menti at 2.4 milliampères. The direct and indirect application of the faradic current gave corresponding results; most painful currents were without effect on the muscles of the nose and the levator labii superioris sinister and the left half of the orbicularis oris inferior. A diminution of excitability was observed also in some degree in the zygomatici, orbicularis oris superior, orbicularis palpebræ, and quadratus and triangularis menti of the left side. Nowhere was there any indication of the reaction of degeneration. A three-centimetre electrode was used for the galvanic current. Otherwise there are no trophic changes in the face, the bones, skin, and hair being normal, as is also sensation. When the tongue is protruded, the point always curves a little to the right; no atrophy. Sense of taste normal. Mucous membrane, organs of sense, circulation, and secretion are normal. There is some lateral curvature of the spine.

In the face we observe that only the muscles are involved in a greater or less degree; I have, therefore, not called the disease facial hemiatrophy. Moore, it is true, defined facial hemiatrophy as progressive muscular atrophy confined to one-half of the face (Seeligmüller, article "Gesichtsatrophie," in Eulenberg's *Encyclopædia*, 1st edition), but in the majority of cases the functions and electrical reactions of the facial muscles do not suffer. Besides, in our case no other trophic lesions, no trigeminus symptoms are present. Progressive facial hemiatrophy has been observed accompanying scleroderma (Eulenberg, *Zeitschrift f. klin. Med.*, 1882; Muratow, *Wratsch*, and *Neurol. Centralblatt*, 1891; Nixon, *Dublin Journal of Medical Science*, 1891; Rosenthal, *Berliner klin. Wochenschrift*, 1889); but in those cases the skin of the face was also affected, while in ours the skin is intact. On the limbs, however, there seems to be a direct connection between the affection of the skin and that of the muscles, as the one is not seen without the other. It may be inferred that both are the results of the same cause. Perhaps the disease of the facial musculature is due to the same agent, but there must be some difference in the morbid process corresponding to the difference in impairment of function, in behavior to the electric current, and to the occurrence of tonic contractions in the muscles of the extremities while they are absent from the face.

THE PHYSIOLOGICAL IMPORTANCE OF THE PROXIMATE PRINCIPLES AND THEIR PRACTICAL UTILITY IN THE FOOD-STUFFS AND IN THE NUTRITIVE PROCESSES OF THE SYSTEM.

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How best to feed the infant and growing child is probably one of the most important and difficult problems that has ever confronted the intelligent physician. In fact, how to most effectually nourish the system throughout life, both in health and disease, is a question of gigantic magnitude.

When an attempt is made to find a concise and satisfactory definition for the term food-stuff the result is a haze of mysterious uncertainty and probabilities.

The rapid strides, however, that have been made in recent years by the practical application of chemical science, together with the careful clinical observations recorded, is rapidly bringing both the theory and practice of feeding to the level of an exact science. This knowledge enables us to say with exact positiveness, that when definite kinds of food-stuffs are introduced into the system certain nutritive changes will follow and a uniform class of substances will appear in the excretions as the final products of tissue waste.

We are no longer compelled to speculate upon theoretical probabilities, but have well-defined and fixed laws to guide us in our work.

A *food-stuff* is best defined as any substance which has for its composition one or more elements from each of the three essential classes of proximate principles, or in other words, a body containing an inorganic element, a CHO compound, as fat, sugar, or starch, and a proteid or CHNOS substance. All other elements, even though they may be somewhat essential and at times absolutely necessary, are still accessory or adjunct substances.

If the relative values and uses of the food-stuffs are to be clearly understood, we must first define the proximate principles and fully understand their individual utility to the system. Then, by tabulating the commonly rated articles called food-stuffs, we can intelligently discuss the subject.

The *proximate principles* are best defined as elements—which are either, chemically speaking, simple or complex bodies—that are absolutely essential to the growth, development, and maintenance of the

animal life. They are best divided into four essential or constructive classes and two extraneous groups.

First class. This includes the inorganic substances, such as water, the phosphates, chlorides, carbonates, sulphates, etc. These chemical compounds all enter the body under their own form, either alone or in combination with two of the other classes. They are not oxidized or broken up within the system, to enter into the chemical formation of other and complex compounds. These inorganic substances are mechanically united, however, with most of the proteid bodies.

In fact their whole action is, as it were, mechanical, and after having served their purpose in the body they pass out of the system with the excretions absolutely unchanged in their chemical composition.

Second class. The CHO compounds, or those which have for their chemical composition the elements carbon, hydrogen, and oxygen only, as fat, sugar, and starch. The native fluid of the body, however, as milk, contains only two of these compounds, viz., fat and sugar, the latter in the form of lactose. In fact, under all circumstances only two, fat and sugar, can gain access to the blood and circulatory channels.

Third class. The CHNOS compounds, or those which have for their chemical composition the elements carbon, hydrogen, nitrogen, and sulphur. The common representatives of this group are called proteids, or the albuminous part of milk, eggs, meats of all kinds, which—chemically and histologically—includes fish, lobsters, crabs, turtles, oysters, and clams, also poultry and game of all kinds. The nitrogenous or albuminous part of all plant life, commonly called vegetable proteid, is included in this class.

Fourth class. The CHNO, CHNOFe, and CHNOFeS compounds, or those bodies which have for their chemical composition the elements carbon, hydrogen, nitrogen, and oxygen alone, and those which have an element of Fe or Fe and S added to the CHNO, and form the various pigments and coloring matters of the blood and tissues. In regard to the exact mode of origin and absolute formation of these bodies we are still somewhat in doubt. It seems quite probable, however, that they belong to the metabolin series which are developed along the natural line of proteid metabolism. That they do not have to be supplied from without the system as a food-stuff has been generally conceded, but it is commonly believed that they are developed out of or from the proteids while passing through the animal organism. That they do exist within the system and are of vital importance, remains unquestioned.

The first, second, and third classes of proximate principles have to be continually renewed from without the body as food-stuffs, while the fourth are as constantly developed within the system.

These four are all the classes that can be considered as necessary or intrinsic proximate principles. The other two classes, or the fifth and

sixth, are wholly foreign or useless elements to be cast off from the body as waste or poisonous products.

Fifth class. This class is best described under the term by-products or katabolin, or as an element occurring along the line of proteid metabolism, when for any reason the normal metabolic processes have been interrupted or disturbed. One of the most common representatives of this class is the alcoholic-like compound, cholesterin or a $C_{26}H_{44}O$ element.

The glycogen found in the liver and formed within the system in many instances is unquestionably a katabolin, or by-product developed out of the proteid metabolism.

In this class may also be included the CHN and the CHNO compounds, or the basic and alkaloidal substances, commonly known as leucomaïnes and ptomaïnes. Of the former sixteen or more have been formulated, while forty or more of the latter have been formulated. Between seventy and eighty have been discovered and named, a few of which have not as yet been given a perfect formula.

The leucomaïnes are more generally developed within the body as the result of a retrograde metamorphosis. The ptomaïnes more frequently originate outside the body from putrefactive changes, and are then introduced into the animal organism. There are, however, many exceptions to these common rules, and both classes may originate within the system and cause in either instance very grave disturbances.

These three sets of compounds, the alcoholic by-products, the leucomaïnes and ptomaïnes—sometimes called toxines, anabolins, or katabolins—are very rapidly coming into prominence, and are undoubtedly very important factors for the complete chemico-physiological explanation of many of the symptoms and pyrexial conditions that are so commonly associated with all the infectious diseases, and also with many of the pathological conditions not directly dependent upon a well-defined and specific infective agent as the exciting cause. These substances—whatever name be applied to them—in many instances play an important part in the etiology, pathology, and therapeutics of digestive disturbances, and consequently call for almost daily recognition, if the chemical phenomena of disease is to be clearly understood and the physician placed in the strongest possible position to most effectually combat all the abnormal conditions.

Sixth class. This class is best called the excrementitious set of products. It includes all the chemical compounds which have been developed out of the normal metabolic transformation of the fats, sugars, and proteid bodies. The starches have been purposely omitted, because starch, as such, never enters the system, but must always be converted into a glucose or alcoholic compound before it can be taken into the vascular channels of the animal economy. The common representatives of this

class are urea, uric acid, kreatinine, hippuric acid, glycocholic and taurocholic acids, carbon dioxide, water, and a sulphur element. In this group are also found the compounds formed by the union of an organic acid and an inorganic salt, such as the urates, hippurates, phosphates, sulphates, glyco- and tauro-cholates. The newly-formed sulphates and phosphates are here spoken of as the salts of the organic acids because the sulphuric and phosphoric acid-forming elements are traceable for their origin to the metabolic transformation of the proteid bodies. These substances cannot in any sense be considered as essential proximate principles, but must be looked upon under all circumstances as foreign bodies which are no longer of any service to the animal economy, and must be cast out of the system as common irritants.

With these sharply drawn lines we are in a measure ready to study the list, which includes the larger number of articles commonly rated as food-stuffs, as given in Table I:

TABLE I.—COMPARATIVE TABLE OF FOOD-STUFFS.

Kind of food.	Water H_2O.	Proteids or CHNOS.	Starch, Sugar and cellulose or CHO.	Fat or CHO.	Mineral Salts.
Human milk	88.28	3.41	4.62	3.48	0 21
Cow's milk	86.23	3.73	4.93	4.50	0.60
Skimmed milk	88.00	4.00	5.04	1.80	0 80
Buttermilk	88.00	4.10	6.40	0.70	0.80
Cream	66.00	2.70	2.80	26.70	1.80
Cheese	41.84	29.23	.....	23.84	5.09
Eggs	69 05	15.58	.....	13.96	1.41
Average meat	65.56	17.51	.....	13.16	3.77
Fat meat	54.22	15.99	.....	28.22	1.57
Lean meat	74.44	19.77	.....	2.56	3.23
Average of fish	75.57	16.98	.....	6.20	1.25
Butter	11.70	0.50	0.50	87.00	0.30
Bread	36.00	7.50	53.85	1.15	1.50
Potatoes	74.50	2.25	21.92	0.15	1.18
Lentils	12.51	24.81	58.36	1.85	2.47
Beans	11.75	24.31	58.03	2.54	3.37
Peas	14.93	23.00	57.80	1.86	2 41
Wheat flour	12.46	14.66	67 62	1.93	3.33
Rye	13.97	14.27	66.91	2.25	2.60
Barley	13.80	12.96	67.18	2.76	3.10
Oatmeal	12.05	12.15	67.00	6.55	2.25
Corn	14.80	12.50	62.65	8.80	1.25
Millet	13.14	12.35	68.35	3.60	2.30
Rice	15.14	7.47	75.69	0.80	0.90
Green vegetables	88.00	2.50	3.25	1.75	4.50
Alcohol (?)	0.75	.....	99.25	.....	.....,

First, however, let us try and understand completely the true and full utility to the system of the first, second, and third classes of proximate principles. This attained, we will know most positively what is necessary to be accomplished in the line of feeding and nutrition, and can learn how most economically to effect the desired results. The inorganic substances, we have already found, are not broken up within the system to form new compounds, but their action, so far as is known, is mechanical.

H_2O. The uncombined water *plus* that in combination in the form of CHNOS in the proteids and the CHO in the fats which can be converted into H_2O, constitutes 80 per cent. of the total body-weight. Water acts as the common solvent to all substances entering into the system that are in solution within the body and that pass out of the system. It also forms the chief bulk of all the fluids of the body, and by its hygroscopic union with the proteid elements determines the consistency of all the anatomical structures of the living organism. Water is one of the chief factors, if not the essential element, in regulating bodily temperature and in preventing desiccation—the latter explaining the reason why man can live longest on water alone.

The water in passing out through the excretory ducts of the renal glands performs an important function in holding in solution the excrementitious products given off by the epithelial cells, and thus carries the effete material on to the bladder and finally to the external world. In this way the uriniferous tubules are constantly kept free and open. In those instances in which the insoluble compounds are given off by the kidneys in excess of what can be held in solution by the normal quantity of water, the taking of copious draughts of mineral water, or, better still, pure water, explains the therapeutic value of H_2O.

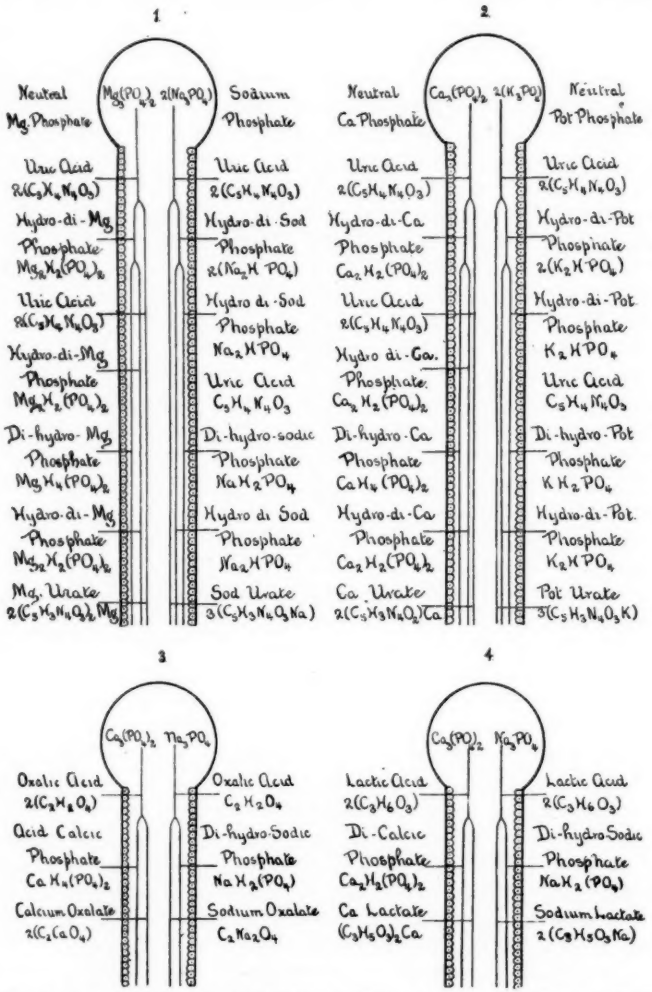
Another very important function of water is in connection with the renal secretion. In the kidneys it is found that the water is constantly discharged into the innermost extremity of the uriniferous tubule through the walls of the capillary bloodvessels which constitute the Malpighian tufts. From this point the water passes down through the lumen of the tubules, across the open ends of the rods of Heidenhain. It is through these capillary tubes of Heidenhain that are found in the epithelial protoplasm of the cells which line the convoluted tubules and the ascending arm of Henle's loop that the excrementitious products resulting from the nitrogenous metabolism are supposed to be formed by the vital action of the protoplasm, and conveyed from the blood or their point of origin in the epithelial corpuscle to the lumen of the excretory uriniferous tubules which enter into the formation of the kidneys. As the water passes through the lumen of these uriniferous tubules and by the open ends of these capillary rods of Heidenhain it is constantly acting upon the principle of a Sprengel's air-pump, and thus helps most positively to draw these waste products through and out of the epithelial cells into the lumen of the uriniferous tubules. This action is also aided by the capillary blood-pressure behind the epithelial cells containing the rods of Heidenhain. By this mechanico-physiological and chemical action the effete products are discharged from the blood and carried rapidly down the excretory ducts beyond the point where they can be reabsorbed into the circulatory channels of the system. The free use of water in this action alone, to say nothing of its many other important

functions, tends to prevent the development of renal lesions, while a scanty use of this element alone is a potent factor in exciting pathological changes in the kidneys in infants and young children: owing to the relatively small size of the lungs and aerating space contained in them, and the propensity to overfeed, the oxygenating capacity of the system is apt to be overtaxed, following which there is a common tendency on the part of the physiological economy to perfectly oxidize the fats and sugars, but to imperfectly oxidize the proteids. As a natural sequence, we have an excessive formation of the katabolin series, which finally appear in the urine as uric acid and cause the symptoms commonly known as "scalding urine," with a marked tendency to the formation of renal calculi. In such instances the copious administration of water will often result in holding this insoluble uric acid in solution and also the acid urates. The amount of water that has to be administered to render the uric acid soluble is very large. By using water containing carbonates and bicarbonates the uric acid is converted into a more soluble compound, the acid urate, and consequently less water will be required to keep the solid particles in a fluid state. This method of treatment, however, is only palliative at best. The correct and physiological method by which these conditions can be most effectually overcome is by avoiding all infant foods which have an immoderate amount of the cereals and CHO compounds of the starch and sugar kind in their composition. The more perfectly the starch and sugar is predigested in the infant food, the greater the danger to the physiological organism, because more of the food product is apt to be absorbed, and a larger amount of oxygen is utilized in transforming the CHO compound into the final product, carbon dioxide and water. A deficient quantity of oxygen is left for the more difficult task of transforming the proteid bodies into the various tissues and ferments of the body, and finally into the complete product urea. The proportionate amount of uric acid increases, and the urea decreases. As a natural sequence, the urinary symptoms become more aggravated, and the evidence of general malnutrition decidedly pronounced, the more perfectly the starches are predigested in the natural or manufactured food-stuffs used.

In these plain and simple physiological and chemical laws we find a complete and lucid explanation of the often-repeated clinical failures in curing these diseased conditions with these various products, until in simple despair the physician comes back to plain sterilized water and small quantities of sterilized and predigested milk or egg-water.

The erroneous theory that water is fattening is clearly disproved if the chemical and physiological laws which have been laid down are in any degree true. For we have already found that water cannot be split up within the system to form fat or any other compound. It is not a

common solvent for fat. The union of the water with the proteid bodies is effected by a common hygroscopic law, which is mechanical as compared with chemical phenomena. These laws being true, the proteid



The figure represents four Malpighian capsules and their respective uriniferous tubules. 1 and 2 illustrate the *normal* chemical changes which occur in the tubules.

3 and 4 illustrate the chemical reactions occurring in the tubules in connection with oxalic and lactic acid formation in place of the normal product, uric acid.

bodies can hold only a given quantity of water, and when fully satisfied, all the H_2O taken in excess of this amount must simply pass out of the body under its own form within the excretions, or it accumulates in the lymph spaces, causing a general or local anasarca.

The *phosphates*, like the water, are not oxidized or split up within the system to form other compounds, but enter the body under their own form and are united mechanically, as it were, with the proteid bodies. The normal phosphate of soda, Na_3PO_4, by its presence, together with the sodium carbonate, Na_2CO_3, causes the alkalinity of all the tissues and most of the fluids of the body, and, so far as known, these salts have no other function to perform within the system. Possibly in the blood they may aid in holding some of the proteid bodies in solution. When, however, they come to pass through the capillary walls of the vessels constituting the Malpighian tufts, and flow along down the uriniferous tubules, the alkaline and earthy phosphates are both attacked by the strong organic acid—uric acid, which is being formed by the epithelial cells, and also discharged into the lumen of the same tubules—and by a chemical reaction at this point are changed into acid phosphates or biphosphates, together with the formation of various urates. (See figure.)

Theoretically, and in the laboratory, the uric acid can be made to attack the phosphate compounds, and two atoms of the organic acid be made to change places with the salts of potassium, sodium, lithium, calcium, or magnesium, etc., with the formation of normal urates of the metal acted upon, and the production of the acid phosphates of the same metal. All these normal urates are much more soluble and less irritating than the acid salts, with the exception of the calcium compounds, where the reverse holds true. Owing, however, to the slow formation and combination of the uric acid with the phosphate compounds, the normal urate salts are rarely, if they are ever, formed in the urinary channels. Practically, therefore, we have to deal, physiologically, clinically, and therapeutically only with the acid salts of the urates and their method of formation.

Where the normal amount of uric acid is formed and a corresponding complement of phosphate is present, two molecules of the alkaline phosphate compound are acted upon by two uric acid molecules, which results in one hydrogen atom of the acid being replaced by one of the metal and *vice versa*, with the formation of two acid urates and two acid phosphates. See Table II.

TABLE II.—CHANGES IN NORMAL AND SUPER-ACID URINE COMMONLY CALLED FERMENTATION OF URINE.

Urea	+ Water	=	Ammonium carbonate	
CH_4N_2O	+ $2(H_2O)$	=	$(NH_4)_2CO_3$	
Uric acid	+ Magnesium phosphate	=	Acid magnesium urate	+ Acid magnesium phosphate
$2(C_5H_4N_4O_3)$	+ $Mg_3(PO_4)_2$	=	$(C_5H_3N_4O_3)_2Mg$	+ $Mg_2H_2(PO_4)_2$

Ammonium carbonate $(NH_4)_2CO_3$ = Water H_2O + Ammonia $(NH_3)_2$ + Carbon dioxide CO_2

Acid magnesium phosphate = Ammonia magnesium phosphate
$2(MgHPO_4)$ = $2(MgNH_4PO_4)$
or
Uric Acid = Ammonium urate
$2(C_5H_4N_4O_3)$ = $2(C_5H_3N_4O_3NH_4)$

Uric acid	+ Normal sodium phosphate[1]	=	Normal sodium urate	+ Acid sodium phosphate[2]
$C_5H_4N_4O_3$	+ $2(Na_2PO_4)$	=	$C_5H_3N_4O_3Na$	+ $2(Na_2HPO_4)$
$2(C_5H_4N_4O_3)$	+ $2(Na_2PO_4)$	=	Acid sodium urate $2(C_5H_2N_4O_3Na)$	+ $2(Na_2HPO_4)$
$C_5H_4N_4O_3$	+ Acid sodium phosphate Na_3HPO_4	=	$C_5H_3N_4O_3Na$	+ Acid sodium phosphate[3] NaH_2PO_4
Uric acid	+ Normal potassium phosphate	=	Normal potassium urate	+ Acid potassium phosphate
$C_5H_4N_4O_3$	+ $2(K_3PO_4)$	=	$C_5H_2N_4O_3K_2$	+ $2(K_2HPO_4)$
$2(C_5H_4N_4O_3)$	+ $2(K_3PO^4)$	=	Acid potassium urate $2(C_5H_3N_4O_3K)$	+ $2(K_2HPO_4)$
$C_5H_4N_4O_3$	+ Acid potassium phosphate K_2HPO_4	=	$C_5H_2N_4O_3K$	+ Acid potassium phosphate KH_2PO_4
Uric acid	+ Normal lithium phosphate	=	Normal lithium urate	+ Acid lithium phosphate
$C_4H_4N_4O_3$	+ $2(Li_3PO_4)$	=	$C_5H_2N_4O_3Li_2$	+ $2(Li_2HPO_4)$
$2(C_5H_4N_4O_3)$	+ $2(Li_3PO_4)$	=	Acid lithium urate $2(C_5H_3N_4O_3Li)$	+ $2(Li_2HPO_4)$
$C_5H_4N_4O_3$	+ Acid lithium phosphate Li_2HPO_4	=	$C_5H_2N_4O_3Li$	+ Acid lithium phosphate LiH_2PO_4
Uric acid	+ Normal calcium phosphate	=	Normal calcium urate	+ Acid calcium phosphate
$C_5H_4N_4O_3$	+ $Ca^3(PO_4)_2$	=	$C_5H_2N_4O_3Ca$	+ $Ca_2H_2(PO_4)_2$
$2(C_5H_4N_4O_3)$	+ $Ca_3(PO_4)_2$	=	Acid calcium urate $(C_5H_3N_4O_3)_2Ca$	+ $Ca_2H_2(PO_4)_2$
$2(C_5H_4N_4O_3)$	+ Acid calcium phosphate $Ca_2H_2(PO_4)_2$	=	$(C_5H_3N_4O_3)_2Ca$	+ Acid calcium phosphate $CaH_4(PO_4)_2$
Uric acid	+ Normal magnesium phosphate	=	Normal magnesium urate	+ Acid magnesium phosphate
$C_5H_4N_4O_3$	+ $Mg_3(PO_4)_2$	=	$C_5H_3N_4O_3Mg$	+ $Mg_2H_2(PO_4)_2$
$2(C_5H_4N_4O_3)$	+ $Mg_3(PO_4)_2$	=	Acidmagnesium urate $(C_5H_3N_4O_3)_2Mg$	+ $Mg_2H_2(PO_4)_2$
$2(C_5H_4N_4O_3)$	+ Acid magnesium phosphate $Mg_2H_2(PO_4)_2$	=	$(C_5H_3N_4O_3)_2Mg$	+ Acid magnesium phosph. $Mg.H_4(PO_4)_2$

Taking the Na_3PO_4 or neutral sodium phosphate for illustration, we find that there are formed in the urine an acid urate of soda and an acid phosphate of soda, which even together with the alkaline salts eliminated still give to the total quantity of urine excreted in the twenty-four hours a faintly acid reaction.

When the neutral phosphates are unusually abundant in the urine, this primary formation of the acid phosphate of soda, Na_2HPO_4, appears to have the property, in conjunction with the other constituents of the urine, of holding an excess of free uric acid in solution. Associated with this there is often seen a primary precipitation of earthy phosphates which has frequently and usually does lead to the erroneous supposition that the patient is suffering from the so-called "phosphatic diathesis," when the true malady is an incomplete oxidization of the proteids, the uric acid condition being masked by the presence of a superabundance

[1] Or neutral sodium-phosphate—a neutral salt with an alkaline reaction.

[2] Or hydro-di-sodium-phosphate—an acid salt with neutral reaction.

[3] Or di-hydrogen-sodium-phosphate—an acid salt with acid reaction. The above applies also to the K, Li, Ca, and Mg phosphates.

of the phosphates. Later on, the increasing acidity of the urine will render the phosphates again soluble, and the urine will spontaneously become more or less clear. This condition is followed by a second spontaneous formation of a precipitate, which is now composed chiefly of the acid urates and possibly some earthy phosphates, and finally when the uric acid is abundant it will be deposited in the crystalline form.

The true condition, which is so frequently masked by the excess of phosphates taken with the food, can always be elucidated by placing the patient upon a milk diet and allowing the urine to stand in a moderately cool place for a few days, when the excess of uric acid which is held in solution will gradually attack the hydro-di-sodium-phosphates and produce more acid urates, and a second or a di-hydro-sodium-phosphate, as for instance, with the $Na_2HPO_4 + C_5H_4N_4O_3 = NaH_2PO_4 + C_5H_3N_4O_3Na$. A similar result can be obtained by taking $4(Na_2PO_4) + 8(C_5H_4N_4O_3) = 4(NaH_2PO_4) + 8(C_5H_3N_6O_3Na)$. The former proposition, however, is more in accord with clinical phenomena.

When this change has been effected, the excess of uric acid, which up to this point was held in solution, gradually appears in a crystalline form on account of the intensely acid medium produced by the formation of this highly acid di-hydro-sodium phosphate. In this manner we have a logical explanation for the changes so frequently observed in the urine, and it has not necessitated the presence of a purely theoretical "acid ferment." This method of studying the urine demonstrates positively the nutritive condition of the body, and clearly proves that there is incomplete oxidization of the proteids, with a diminution in the amount of urea formed and that there is an excessive formation of uric acid.

When the metabolic processes of the body are accurately performed, the normal relative proportions of urea and uric acid formed, it renders the total quantity of urine passed in twenty-four hours faintly acid. Such urine changes within forty-eight hours to an alkaline reaction, caused by the urea taking up two molecules of water and the formation of a carbonate of ammonia. This carbonate of ammonia is then transformed by the action of the uric acid or by the intervention of a bacteterial ferment, into water, carbon dioxide, and free ammonia (NH_3). The ammonia then attracts a hydrogen element to itself from the acid magnesium phosphate—which has been previously formed in the kidney tubules—forming the ammonio-magnesium or triple phosphate, $MgNH_4(PO_4)_2$, as given in Table II., or in the absence of the acid magnesium phosphate, or after it has been exhausted, the free ammonia attracts a hydrogen element from the uric acid, forming a (NH_4) compound, which then replaces the hydrogen element of the uric acid and forms the urate of ammonia, $C_5H_3N_4O_3(NH_4)$, commonly found in alkaline urine.

By thus carefully analyzing urine we are enabled to say positively

whether our foods are properly oxidized or not, and we can also determine the degree of derangement in the nutritive processes.

The sodium, potassium, lithium, calcium, and magnesium phosphates can all be transformed in this same manner into acid urates and phosphates.

In other words, when uric acid is produced in small quantities there is only a small amount of the acid phosphates formed, and no surplus uric acid remains to act upon the Na_2HPO_4, and form the more acid phosphate NaH_2PO_4.

In the first instance alkaline transformation rapidly ensues, but where the uric acid is present in abnormally large quantities the super-acids are formed in excess, and the excess of uric acid is consequently precipitated and made plainly visible to the unaided eye.

These chemical facts fully explain the relief of the local irritation and the changes in the reaction of the urine when the potassium, sodium, or lithium, magnesium or calcium salts in the form of carbonates or bicarbonates are freely administered in these uric acid conditions, as illustrated in Table III.

TABLE III.—CHANGES IN THE URINE AFTER GIVING THE CARBONATES AND BICARBONATES.

Uric acid	+ Lithium carbonate	= Normal lithium urate	+ Water	+ Carbon dioxide
$3(C_5H_4N_4O_3)$	+ $3(Li_2CO_3)$	= $3(C_5H_2N_4O_3Li_2)$	+ $3(H_2O)$	+ $3(CO_2)$
$2(C_5H_4N_4O_3)$	+ Li_2CO_3	= Acid lithium urate $2(C_5H_3N_4O_3Li)$	+ H_2O	+ CO_2
$C_5H_4N_4O_3$	+ Lithium bicarbonate $LiHCO_3$	= $C_5H_3N_4O_3Li$	+ H_2O	+ CO_2
Uric acid	+ Potassium carbonate	= Normal potassium urate	+ Water	+ Carbon dioxide
$3(C_5H_4N_4O_3)$	+ $3(K_2CO_3)$	= $3(C_5H_2N_4O_3K_2)$	+ $3(H_2O)$	+ $3(CO_2)$
$2(C_5H_4N_4O_3)$	+ K_2CO_3	= Acid potassium urate $2(C_5H_3N_4O_3K)$	+ H_2O	+ CO_2
$C_5H_4N_4O_3$	+ Potassium bicarbonate $KHCO_3$	= $C_5H_3N_4O_3K$	+ H_2O	+ CO_2
Uric acid	+ Sodium carbonate	= Normal sodium urate	+ Water	+ Carbon dioxide
$3(C_5H_4N_4O_3)$	+ $3(Na_2CO_3)$	= $3(C_5H_2N_4O_3Na_2)$	+ $3(H_2O)$	+ $3(CO_2)$
$2(C_5H_4N_4O_3)$	+ Na_2CO_3	= Acid sodium urate $2(C_5H_3N_4O_3Na)$	+ H_2O	+ CO_2
$C_5H_4N_4O_3$	+ Sodium bicarbonate $NaHCO_3$	= $C_5H_3N_4O_3Na$	+ H_2O	+ CO_2
Uric acid	+ Magnesium carbonate	= Normal magnesium urate	+ Water	+ Carbon dioxide
$C_5H_4N_4O_3$	+ $MgCO_3$	= $C_5H_2N_4O_3Mg$	+ H_2O	+ CO_2
$2(C_5H_4N_4O_3)$	+ $MgCO_3$	= Acid magnesium urate $(C_5H_3N_4O_3)_2Mg$	+ H_2O	+ CO_2
$2(C_5H_4N_4O_3)$	+ Magnesiumbicarbonate $MgH_2(CO_3)_2$	= $(C_5H_3N_4O_3)_2Mg$	+ $2(H_2O)$	+ $2(CO_2)$
Uric acid	+ Calcium carbonate	= Normal calcium urate	+ Water	+ Carbon dioxide
$C_5H_4N_4O_3$	+ $CaCO_3$	= $(C_5H_2N_4O_3Ca$	+ H_2O	+ CO_2
$2(C_5H_4N_4O_3)$	+ $CaCO_3$	= Acid calcium urate $(C_5H_3N_4O_3)_2Ca$	+ H_2O	+ CO_2
$2(C_5H_4N_4O_3)$	+ Calcium bicarbonate $CaH_2(CO_3)_2$	= $(C_5H_3N_4O_3)_2Ca$	+ $2(H_2O)$	+ $2(CO_2)$

These chemical laws further show clearly that no improvement in the nutrition of the body can be directly affected by such a line of treatment, because the phosphates or carbonates and the uric acid do not join within the body, but all these chemical reactions occur on the outside of the body as it were, or in the urinary passages. It also illustrates

perfectly the well-known and often-repeated clinical facts, that all the symptoms in these instances almost immediately return so soon as the treatment is suspended.

The normal sodium phosphate, Na_3PO_4, and the calcium phosphate, $Ca_3(PO_4)_2$, pass in and out of the system in small quantities, and so far as is known are absolutely unchanged while making their transit through the body. Being almost insoluble compounds, they must pass through the system, if in any quantity, in a state of suspension intimately associated with the proteid bodies, in small quantities or in large amounts, as the latter is found in the osseous structures.

When the calcic phosphate reaches the kidneys, however, it is also attacked by the uric acid, and by the action of this powerful organic acid changed with the formation of the acid phosphates of calcium and an acid urate of lime. Thus: $2(C_5H_4N_4O_3) + Ca_3(PO_4)_2 = (C_5H_3N_4O_3)_2 Ca + Ca_2H_2(PO_4)_2$, or by taking eight uric acid molecules and two calcium phosphate molecules the soluble tricalcic salt can be produced, thus: $8(C_5H_4N_4O_3) + 2\,Ca_3(PO_4)_2 = 4(C_5H_3N_4O_3)_2Ca + 2\,CaH_4(PO_4)_2$.

These well-defined chemical laws, when correctly applied to our clinical cases, show clearly how near to an exact science medicine is rapidly approaching, and explains perfectly many things which in the past were looked upon as almost unfathomable mysteries. Such laws as these illustrate how far from the truth clinical observations and deductions, which are based upon symptoms alone, will often carry us, and how, by the disappearance of symptoms, we can be deluded into the belief that our patients are relieved of the true malady, while at the same time the original abnormality remains untouched and the deeper retrograde processes go on, quietly undermining the vital integrity of the system, until death, quietly and almost unawares, and as a thief in the night, claims the victory.

Assuming that these chemical and physiological truths are correct, that the body requires only a limited amount of the alkaline and earthy phosphates per day—which are usually more than abundantly supplied in the ordinary food-stuffs—and that these salts, as well as all the inorganic compounds, cannot be oxidized, split up, or utilized within the system except in the mechanical manner already described, proves conclusively that all the phosphate, and especially the hypophosphite, compounds cannot be oxidized or broken up and made of any other use to the economy. It demonstrates positively that they pass into the body in a given form, are carried on through the system unchanged, and finally pass out again identically the same as when they were first introduced.

The only possible method by which any therapeutic action upon the system can be ascribed to the phosphates and hypophosphites is to assume

that when they are taken in excess of the prescribed physiological kind and quantity they may act by their superabundance as foreign bodies, and in this way become irritants to the system. To remove this foreign substance the system is called upon to make abnormally great exertions, and in doing so the struggle for the right of supremacy results in Nature claiming the victory, by appropriating to herself a true nutritive pabulum from some other source—viz., the proteids taken at the same time—and thus the animal organism is enabled to accomplish this large task, until finally in this very indirect manner an improved nutritive condition is occasionally effected, but more frequently failure closes the experiment.

If for any reason the food is deficient in the phosphates, either earthy or alkaline, then the addition of the requisite quantity of the normal or acid phosphate of sodium, potassium, calcium, or magnesium, as the condition may indicate, will, when they are supplied up to the point of deficiency, be of great service. An excessive use of these salts will not improve the abnormality; but in those instances in which there is a marked discrepancy in these salts or on the part of the system to retain the requisite quantity of mineral matter in the right place, the true physiological defect is generally, if not always, the result of a faulty proteid metabolism, and not to the absence of the phosphate salts in the food-stuffs or in the system. This assertion has been proven over and over again by the repeated failures to eradicate these diseases even when the salts are appropriately supplied to the system.

From the nature of these chemical laws there is no possible chance under any circumstance to expect that the hypophosphites can be oxidized or split up and converted back into a simpler compound. Even in the simpler forms Nature can only in a limited and mechanical manner utilize these inorganic compounds to advantage. We ought not, therefore, to expect the system, in opposition to these natural and well-defined laws, to change a $CaH_4(PO_3)_2$ compound and convert it into a $Ca_3(PO_4)_2$ substance. Careful analysis of the urine further proves that this is not accomplished, but that these compounds pass out of the body absolutely unchanged.

Further than this, it is unjust to attach any specific effect to the hypophosphites as ordinarily prescribed. For they are rarely, if ever, administered alone.

To assert, therefore, that one drug is the agent which produces the good result where many other drugs are given in the same menstruum, all of which are of higher potency and greater known utility, is hardly consistent with good therapeutics.

Of the *carbonates*, the two principal salts are the sodium carbonate, Na_2Co_3, and the bicarbonate, $NaHCO_3$. Both of these are supplied through the food-stuffs. The carbonates, however, are generally said to

be formed from the vegetable salts, but this chemical phenomenon is not made very clear. The carbonates are principally found in the blood, and have for their function chiefly the carrying of the carbon dioxide—by the CO_2 being combined with the carbonate—and by which the carbon dioxide is conveyed from the tissues to the lungs, where the CO_2 is released from this union with the carbonate and discharged free into the air contained in the respiratory passages, and finally given out in the exhaled breath. Thus, the $Na_2CO_3+CO_2+H_2O=2(NaHCO_3)$, which, when it reaches the lungs, gives up the CO_2, reverts into sodium carbonate—thus, $2(NaHCO_3)-CO_2=Na_2CO_3+H_2O$.

There is also a little calcium carbonate, $CaCO_3$, taken into the system, but the quantity is generally very small. So far as is known, the carbonates are not decomposed within the body, except in changing from the carbonate to the bicarbonate, but appear to be eliminated under their own form, either as a carbonate or bicarbonate, with the pancreatic secretion. This is especially true of the sodium carbonate which together with the sodium phosphate, Na_3PO_4, furnishes the chief elements which are said to give to the pancreatic fluid its strong alkalinity and enable the triptic ferment to peptonize the proteids and the steaptic ferment to accomplish the emulsification and saponification of the fats.

In the herbiverous animals, however, the carbonates are taken into the system in much larger amounts, and are eliminated from the body in the urine. But in the human subject the calcium carbonate or phosphate is rarely seen in the urine. If the individual should chance to take an excess of either of these salts in the food, the calcium carbonate and phosphate will then be absorbed into the circulation and of necessity appear in the urine.

The *chlorides*, NaCl and KCl, and especially the sodium salt, stands third as regards quantity among the list of inorganic proximate principles introduced into the system. In the blood, however, it stands second to water as regards quantity, and, as it concerns the functional activity of the body throughout the system, it at all times and places stands second only to water. There is nothing else taken into the animal economy the absence of which so profoundly disturbs the whole animal organism as does the chloride of sodium.

The functions of NaCl are much more extensive than is commonly inferred by reference to our text-books. Many of these functions have been elucidated by careful clinical observation and analogy.

First, chloride of sodium is a very important factor in making food palatable and in stimulating the salivary secretions and in maintaining a good appetite. With this simple function well sustained there is a more rapid and perfect digestion in the stomach; this in turn is naturally followed by a more effectual action in the intestinal canal. These results are, of course, secondary in nature, yet primarily dependent upon

the presence of the salt. When the alimentary tract is reached and the food-stuffs fully digested and liquefied and ready for absorption, the chloride of sodium now by its direct presence becomes an active and essential agent, and causes the diffusable pabulum to pass much more rapidly through the intestinal and capillary wall into the blood-stream. Its presence is not only essential in helping the food-stuffs into the blood, but the NaCl is constantly in action all along the vascular line, aiding throughout the system in all endosmatic actions, wherever the nutritive pabulum is being transferred from the blood to the perivascular structures. Whether the sodium chloride aids in the backward exchanges of the waste products from the perivascular tissue to the blood and lymphatic channels is not as positively known, but in all probability it acts in both directions; for early in all truly inflammatory exudations the chloride of sodium is found to leave the bloodvessels and is abundant in the exudation, and this salt is always among the first to find its way back into the blood-stream.

In the blood the sodium chloride is the important factor in helping to hold a larger percentage of albumin in solution in water than could be accomplished in its absence. It is also an important agent in retaining the paraglobulin in a perfect solution, for we are told that paraglobulin is precipitated by carbon-dioxide in the absence of the sodium chloride salt. Now, if three-fifths of all the CO_2 contained in the blood is in solution and only two-fifths is in combination, it is but reasonable to suppose that the presence of this salt is principally concerned in preventing this large quantity of carbon-dioxide from precipitating some, if not all, of this proteid substance. While there are other compounds in the blood that may help to hold the paraglobulin in solution, that is no reason why this known action of the sodium chloride should be altogether ignored. The indisputable fact of its abundance and importance next to water clearly indicates that it has major work to perform.

The NaCl may also be considered of importance in keeping the myosene of the sarcous elements in solution or state of vital activity. So soon as death occurs and the blood leaves the capillary vessels and accumulates in the large veins it rapidly abstracts this solution of the sodium chloride from contact with the muscle-tissue, and the myosene rapidly solidifies, and the condition known as *rigor mortis* is developed.

Viewed in this light sodium chloride is a very important element in the dietary list. There is scarcely any doubt that the absence of this salt from the food of the infant is often largely responsible for many of the digestive disturbances and faulty conditions in assimilation so common in this class. The good cook always adds this element, while the nurse usually omits this essential adjunct, fearing it will make the baby thirsty. The directions on every infant-food should read: "Always add a pinch of salt at each feeding, and, as a rule, omit the use of sugar."

By some the statement is made that probably a small amount of the chlorine of the sodium chloride is set free and joins with an element of potassium to form a potassium chloride, which is said to be indispensable to the most perfect action of the muscles. The proof for the first part of the assertion is not clearly stated. Observing the common law which appears to be pretty generally applicable in regard to all the inorganic compounds—which is, that they are not decomposed into other substances within the system—it seems reasonable to doubt this assumption, at least until stronger proof is produced. It is far more probable that a certain amount of potassium chloride is introduced with the food-stuffs.

Another interesting and important fact in connection with the NaCl is the well-known tenacity on the part of the proteid bodies to retain the sodium chloride in connection with them, when the administration of this salt has been for any reason suspended. This ability on the part of the proteids to retain the sodium chloride is clearly proven by the extreme slowness with which it is eliminated from the system under these circumstances.

All these recorded facts clearly prove that when this salt is freely and abundantly supplied to the system large quantities pass quickly through and out of the body, and very decidedly increase the rapidity and perfection of tissue and glandular metabolism.

The *magnesium phosphate*, $Mg_3(PO_4)_2$, $Mg_2H_2(PO_4)_2$, occurs in connection with the $Ca_3(PO_4)_2$ and the $CaH_4(PO_4)_2$, but in very small amounts. It is finally eliminated from the body unchanged. When it reaches the urinary passages it is acted upon by the uric acid and changed into $MgHPO_4$ (see Table II), and held in solution until the alkaline transformation occurs, when it is converted into the triple salt, ammonio-magnesium-phosphate, $MgNH_4PO_4$, as already described, its chief importance being found in connection with the urinary changes.

The *sulphates* and a number of other compounds of inorganic nature, excepting iron, are found in the system in comparatively small quantities and appear to be of minor importance, if any at all.

With the *iron*, however, there is no direct proof that it becomes associated with the proteid bodies except in a mechanical manner, as found true for all the other substances of this class. From the fact that the coloring-matters in many of their general characteristics belong to the proteid class of bodies it might very justly, perhaps, be argued that as these substances contained an element of iron in their atomic formulary construction, it looks like a chemical union. If so, it is evidence of a direct chemical union in the body of an inorganic compound with an organic, nitrogenous, and proteid body. The fact that the coloring-matters are not introduced, so far as we know, from without in their own form, but appear to be developed within the body, is also good evidence substantiating this view. If we accept this supposition, we have a com-

plete illustrative exception to our well-defined and common law. But even this assumption has not as yet been clearly defined and the exact place of formation of these bodies described with sufficient accuracy to furnish any chemical laws or formulæ that will clearly elucidate this problem.

The utility of the *second class*, or the CHO compounds, as fat, sugar, and starch, may be quite concisely stated. With the exception of fat, these elements, as sugar and starch, must first be converted into a glucose or alcohol-like compound before they can reach the blood-vascular channels. After having once entered the blood-stream they rapidly lose their identity, but shortly appear, after having served their purpose to the system, in the excretions of the body as carbon-dioxide and water. (See Table IV.)

TABLE IV.—PRODUCTS OF OXIDIZATION OF THE CHO FOOD-STUFFS AND ALCOHOL.

Stearin	$C_{57}H_{110}O_6$	+	163(O)	=	57(CO_2)	+	55(H_2O)
Olein	$C_{57}H_{108}O_6$	+	160(O)	=	57(CO_2)	+	52(H_2O)
Palmitine	$C_{51}H_{98}O_6$	+	145(O)	=	51(CO_2)	+	49(H_2O)
Sugar	$C_6H_{12}O_6$	+	12(O)	=	6(CO_2)	+	6(H_2O)
Starch	$C_6H_{10}O_5$	+	12(O)	=	6(CO_2)	+	5(H_2O)
Alcohol	C_2H_6O	+	6(O)	=	2(CO_2)	+	3(H_2O)
	$C_{179}H_{340}O_{20}$	+	489(O)	=	179(CO_2)	+	170(H_2O)

While passing through this transitional process all these CHO compounds yield to the system heat, energy, lubrication, and rotundity, as illustrated by Table V.

TABLE V.—RESULTS OF OXIDIZATION OF THE CHO COMPOUNDS.

Fats, Sugars, Starches, and Alcohol,	yield to the body	heat, energy, and rotundity, and act as lubricating agents, and aid in perfecting the proteid metabolism,	and are excreted from the body as	carbon-dioxide and water.

This heat and energy evolved by the oxidization of these compounds is essential in perfecting the metabolic processes effected in the proteid bodies. When these CHO compounds are taken too freely they have a tendency to exhaust the supply of oxygen and ultimately retard proteid anabolism.

The rotundity of form which is developed out of the fats, sugars, and alcohols is not the result of the chemical elements which constitute these compounds being split up and entering into the vital construction of the histological tissues of the body; it follows from more of the CHO elements in the form of oil-globules being taken into the system than Nature can possibly oxidize and convert into the complete products of oxidization—carbon-dioxide and water. Another and probably more accurate method of developing obesity, however, is from the incomplete oxidization of the proteids and the formation of fat as one of the by-products resulting from an imperfect metabolism of the proteids. The chief

reason for this view is the chemical law that CHO compounds rarely stop short of the final products of their oxidization—carbon-dioxide and water—while the proteids are prone to incomplete oxidization and the formation of an almost innumerable number of by-products. As a sequence of this the surplus of oil-globules becomes stored up mechanically in the protoplasmic elements of the hepatic cells, giving rise to the condition known as fatty infiltration of the liver, or they are packed away in the interstices of the white fibrillated connective-tissue substance of the body, causing the condition commonly called obesity. All the fat that is added to the animal economy over and above five per cent. of the total body-weight is usually the result of an abnormal physiological condition of the nutritive system. While this abnormal amount of adipose tissue may, perhaps, in the common acceptation of the eye beautify the macroscopic appearance of the individual, it is no guarantee of a sounder constitution or a higher vitality in the microscopic and chemical construction of the bodily tissues; generally it indicates the reverse or that a pathological condition is hidden underneath this surface beauty.

Such laws as these prove conclusively that cod-liver oil in large amounts can do little good except to beautify the human race or greatly increase mortality and shorten longevity. Nature indicates that a given quantity of fat is all that is required to carry on the physiological functions of the body most perfectly, and, as a rule, the ordinary food-stuffs contain more than the required amount. To add a larger quantity often thwarts Nature in her best efforts, and results in an untimely death when recovery might have been the result.

The paramount utility of the *third class*, or the CHNOS or proteid compounds, cannot be too fully realized, for out of these elements alone the fundamental parts of the body and all the ferments are developed, the second class simply yielding the heat and so-called energy by which the proteid bodies can be kept at a given temperature and most perfectly carried through their complex metabolic transformations. This process, when successfully accomplished, results in the perfect development and maintenance of all the histological structures of the body, furnishes all the ferment bodies of the animal system by the action of which not only the proteids, but the CHO elements, are placed in a condition to gain access to the body and be of service in sustaining the chemico-physiological changes that constitute vital action. To enter into the minute details of the digestive and assimilative processes developed out of the proteid substances, although intensely interesting and of vital importance, would carry us far beyond the original purpose of this paper. Suffice to say that when the proteid bodies are perfectly oxidized they will yield the final products, urea, uric acid, kreatinine, carbon-dioxide, and water, in the following proportions, as illustrated by this equation:

One molecule of proteid represented by $C_{72}H_{112}N_{18}O_{22}S + 139(O) = 4(CH_4N_2O) + C_5H_4N_4O_3 + 2(C_4H_7N_3O) + 55(CO_2) + 38(H_2O) + H_2SO_4$. Or the one molecule of proteid matter when completely and perfectly oxidized yields four molecules of urea, one of uric acid, two of kreatinine, fifty-five of carbon-dioxide, thirty-eight of water, and one of a sulphuric acid, forming elements which are represented in the urinary excretion as a sulphate. These excrementitious products, when formed in these proportions, are considered as indicating the results of a normal proteid metabolism, and yield the following results, as given in Table VI:

TABLE VI.—RESULTS OF OXIDIZING THE CHNOS COMPOUNDS.

The proteids $C_{72}H_{112}N_{18}O_{22}S$	are developed into all forms of bodily tissues and also form all the ferments,	yielding	heat, energy, muscular, glandular, and vital activity,	and are excreted from the body as	urea, uric acid, kreatinine, carbon-dioxide, water, and sulphuric acid, forming elements as sulphates.

This table of proteid oxidization clearly illustrates the magnitude of the work to be accomplished by the presence of the proteid bodies, and also indicates the internal and complex metabolic changes through which they must pass before they can be developed into these active and living agents and give forth their intense and mighty power, as evinced in the superb physical and mental attainments that are characteristic of man. It also demonstrates clearly the necessity of maintaining a perfect transformation of these compounds to prevent the development of abnormal and poisonous elements.

The ease with which these perfect results can be disturbed and the large number of normal and by-products which have already been discovered along this line of proteid oxidization show that when the normal process is in any degree changed or modified a profound abnormality must follow. It proves the absolute necessity of carefully guarding the perfection of these physiological and vital actions. The profound and toxic symptoms frequently developed by the presence of some of the leucomaïnes and ptomaïnes prove the danger that may arise from an abnormal transformation of these proteid bodies. The ease and rapidity with which the abnormal symptoms so produced can be removed; the rapidity with which nutrition can be perfectly reëstablished, and the abnormal give place to normal actions, and the abnormal products in the excretions be changed to those indicative of a normal transformation of the proteid substances as they pass along through the animal organism, prove most conclusively that this line of argument is correct. It also fully substantiates the assertion that intelligent regulation of the diet in absolute accord with these well-defined chemical and physiological laws, together with well-directed therapeutic agents scientifically applied and used in strict conformity with these same fixed physiological and chemical principles, and not given empirically, will yield exact results.

REVIEWS.

A TREATISE ON THE LIGATION OF THE GREAT ARTERIES IN CONTINUITY, WITH OBSERVATIONS ON THE NATURE, PROGRESS, AND TREATMENT OF ANEURISM. By CHARLES A. BALLANCE, M.B., M.S. Lond., F.R.C.S., Assistant Surgeon to St. Thomas's Hospital and Joint Lecturer on Practical Surgery in the Medical School; Surgeon to the National Hospital for the Paralyzed and Epileptic, Queen Square; Assistant Surgeon to the Hospital for Sick Children, Great Ormond Street: and WALTER EDMUNDS, M.A. Cantab., F.R.C.S., Resident Medical Officer, St. Thomas's Home. Illustrated by 10 plates and 232 figures. 8vo., pp. 568. London: Macmillan & Co., 1892.

THIS magnificent work, destined certainly to be a classic in its field, is a monument to the enthusiasm, perseverance, knowledge, and ingenuity of its authors, as well as the most complete and original contribution to the histology, pathology, and surgery of the arteries that has ever appeared. Small portions of the work have already been published before definite conclusions had been reached, but as a whole the book is essentially new.

Almost every possible question relating to the arteries, whether previously considered settled or not, has been most elaborately gone over by experiment and research, so that we have here the entire subject reviewed from the very beginnings of surgical teaching to the present time. To every point has been applied a wealth of experiment, and from all sources of knowledge combined have been deduced facts of the greatest practical value to the surgeon who is to ligate vessels in continuity or otherwise. Nor can the work be of less value to the histologist, pathologist, physiologist, or, in fact, to any member of the profession, no matter what may be his special field—for extensive knowledge of the blood-vessels is essential in every department of medicine, and in this volume are to be found the results of skilled research which have consumed years in their elaboration and conclusion, and which cannot be ignored by those who would be erudite and proficient in their art.

The pains at which the authors have been to arrive at the truth and the whole truth and to eliminate error are indeed remarkable; everything has the impress of as great accuracy and freedom from error as it is possible to attain by human means. Almost all their conclusions are just and apparently inevitable.

The most important points insisted upon, and, it would appear, conclusively established, are three in number: First, that ligation under all circumstances is vastly more successful where the inner coats of the vessel are not ruptured; second, that the present methods of using the ligature are totally inadequate for the larger vessels; and, third, that the

formation, function, and fate of the clot have been very much misunderstood.

Each chapter has been so written that it is a thesis upon its particular caption, while the aggregate forms a complete treatise upon the entire subject. The first relates to the general subject of hemorrhage in man. It is maintained from an elaborate statistical study that general use of antiseptics has but little reduced the danger from hemorrhage after ligation of large vessels, and that the method of ligating is much more responsible for this menace than is the presence of suppuration. While it is granted that a general impression prevails that aneurisms treated by proximal ligation do well, the authors believe that this impression is totally unfounded in general, and has been originated by the frequency and success with which the superficial femoral has been ligated for aneurism. Excluding this artery, the tables show the percentage of hemorrhage still to be very high.

The value of experiments upon animals is accorded the second chapter, and their bearing as applied to similar processes in man is well elucidated. We are pleased to note the precautions taken to prevent suffering, and the universal employment of anæsthetics. It is a significant point, as bearing upon the controversy being at present carried on regarding the relative dangers of chloroform and ether, that chloroform was very early abandoned on account of frequent fatalities, while with ether practically none occurred.

Chapter III. deals with the minute anatomy of arteries and their physical attributes, from which many conclusions bearing upon practical surgery are reached.

The most important deductions from the fourth and fifth chapters, dealing with physiological and pathological occlusion of arteries, are, that in ligation rupture of the coats is not necessary for occlusion, and that where the tunics are not thus ruptured hemorrhage never occurs, even when serious pathological changes are present and in active progress.

An extensive series of experiments under head of "conduct and fate of the corpuscles of the blood after ligation" leads to the conclusion in the next chapter that "the scar tissue which occludes the artery is formed, not from the leucocytes of the blood, but from the plasma cells of the arterial wall, and that this process will take place perfectly if the vessel is simply occluded without damage to its walls."

Next succeed chapters upon the conduct and fate of the coats, and the conduct and fate of the ligature. In the latter the writers conclude that every known form of ligature except gold or platinum wire is ultimately absorbed, and that, contrary to usual belief, many animal ligatures are absorbed more rapidly in the presence of bacteria.

Chapter XI., upon suppuration after ligation, evidences the great dangers arising from suppuration in the neighborhood of a great artery, especially if the coats have been ruptured; hemorrhage, aneurism, or gangrene are then threatening possibilities; and "though it be possible that with Listerian precautions any vessel up to the size of the superficial femoral may be ligated by almost any method with success, yet this cannot be employed as an argument in favor of rupturing the coats, nor can any security which antiseptics may afford justify the practice."

In the following two chapters the pathology of hemorrhage and the conduct and fate of the aneurism receive elaborate consideration.

Chapter XVI. is devoted to the very practical question of the choice of the ligature. Here the selection of the writers, very guardedly reached, is, in order of preference, ox peritoneum, kangaroo tendon, boiled floss silk, or, failing these, Chinese twist, chromic catgut, or silk-worm-gut. They have found that chromic catgut will last long enough for the purpose if suppuration does not intervene, but that in the latter case absorption is dangerously rapid owing to the working of cells into its interstices. Fine silk boiled in 1 to 500 bichloride of mercury solution is by them perferred for ordinary daily use instead of catgut.

The following division relates to the choice of the knot. Contrary to general supposition, it is here clearly proved that the reef knot can be, and frequently is, converted into a slip knot by even slight irregular traction on the ends of the ligature before the second tie is made. It is also demonstrated that in ligating large vessels the surgeon's knot cannot be so tied that the first tie will not loosen before the second is brought down upon it except when the first is made so tight as to rupture two or more coats of the artery—the one point above all others that this book is intended to show should never be done. All sorts of knots were extensively experimented with, and proved unsatisfactory for one cause or another, except one, termed by the authors the "stay knot." This—the one recommended—is made by passing two or more strands of large-size ligature about the vessel so that they shall lie side by side. The first tie of a reef or surgeon's knot is then made in each successively, and all the ends pulled upon together at each side until the vessel is sufficiently occluded. The second tie of the knot is made by bunching all the strands on each side, and tying down the second knot as if each bunch was a single strand. Experimentally, these knots were found to possess manifold advantages over all others for the larger vessels; but it is also shown that the knot, as well as the ligature material, is almost a matter of indifference in dealing with vessels smaller than the superficial femoral.

Suggestions and conclusions as to the force necessary to occlude yet not rupture the inner coats of arteries occupy Chapter XVIII.; ligation experiments, Chapter XIX.; and the conduct of the operation and fate of the patient, the twentieth and final chapter. In the latter the operative method of ligating the larger arteries is very well described and illustrated, but little original matter appears. Three appendices follow, devoted respectively to the subjects of "Blood Pressure in Aneurisms," "Blood Currents in Aneurisms," and the "Choice of the Antiseptic." Bichloride of mercury is the antiseptic chosen as best in performance of the operation of ligation. A copious list of authorities and a good index conclude the work.

Exceptionally profuse and beautiful illustration is a marked and pleasing feature of this book. The plates and cuts attest the remarkable skill and accuracy of the artist, Mr. Lapidge, who has worked them out in an unusually brilliant manner. Typographically the volume is also exceptionally beautiful and up to highest standard.

T. S. K. M.

SCIENCE AND ART OF MIDWIFERY. By WILLIAM THOMPSON LUSK, A.M., M.D., Professor of Obstetrics and the Diseases of Women and Children in the Bellevue Hospital Medical College; Consulting Physician to the Maternity Hospital and to the Foundling Asylum; Visiting Physician to the Emergency Hospital; Gynecologist to the Bellevue and the St. Vincent Hospitals; Honorary Fellow of the Edinburgh and London Obstetrical Societies; Corresponding Fellow of the Obstetrical Societies of Paris and Leipzig; Corresponding Fellow of the Paris Academy of Medicine, etc. New edition, revised and enlarged, with numerous illustrations. Pp. xviii., 761. New York: D. Appleton & Co., 1892.

DR. LUSK'S book has been so long an acknowledged authority on obstetrics that little remains for us to add to the fresh encomiums called forth by the appearance of each new edition. But, as the author properly remarks in the modest preface so characteristic of himself, in the seven years which have elapsed since the third edition was published, the "changes that have taken place in both the theory and practice of obstetrics have made it necessary for him (me) to present to the profession what is essentially a new book." All who know the careful and conscientious way in which Dr. Lusk does his work do not need this statement to assure them that every page has been subjected to rigid scrutiny. The most superficial reader, in comparing the new edition with the old, is conscious of the progressive spirit which inspired him. It is truly a pleasure to see that one, who might well have been satisfied with a great and deserved reputation, is so careful of it that he can take the time from his busy life to establish it upon a still more solid foundation by the same patient, thorough work which won his success. No book can ever be behind the times with such an author.

Without describing too minutely the changes noted in the fourth edition, we would refer only to those which are most important, in order to show that the book still maintains its high position as the best "all-around" text-book on midwifery for the student and practitioner. Perhaps the best indication of its scholarly character is afforded by the numerous additional foot-notes, which show how thoroughly the literature of the subject has been studied. The chapters on anatomy and physiology, which most writers are too careless or too indolent to revise, have been subjected to rigid criticism. Note the description of the placenta and the reconstruction of the section on the changes in the cervix uteri during pregnancy, the latter being illustrated by three new cuts (Figures 56, 57, and 58). The important subject of the vomiting of pregnancy receives the attention which its importance demands, Copeman's method being considered at length, as well as the induction of abortion.

In Chapter XI., on the management of normal labor, we note (page 207) the influence of modern aseptic principles. The author's position is clearly indicated by this brief sentence: "Under normal conditions the vagina is to be regarded as aseptic." Pages could not express more forcibly the important principle that meddlesome midwifery may consist just as truly in over-caution as in rash interference with natural processes. The sections on the preservation of the perineum and on tying the cord have been carefully revised and new matter added (pages 213 and

216). The same is true of the description of Credé's method. In the paragraph on passing the urine after labor, a concession is made to those obstetricians who hold (and with considerable propriety) that the patient should be allowed to assume the upright posture. On page 280 we note a new study of the subject of retroflexion of the gravid uterus, and on page 305 an important note on missed labor.

The chapter on extra-uterine pregnancy (XVII.) is practically new. The author properly differs from Tait's dogmatic assertion, that rupture is not delayed later than the twelfth week. He believes that ovarian pregnancy is a possibility, but that "the question as to the occurrence of primary abdominal pregnancy must be regarded as unsettled." The subject of the care of premature infants is carefully considered, the different incubators being described and figured. In the chapter on the forceps we are glad to observe directions for their use in occipito-posterior positions, illustrated by cuts from Farabœuf and Tarnier, from whom several other figures are borrowed. The author's well-known views with regard to the application of forceps to the thighs in breech-presentation are stated on pages 388 and 389.

In Chapter XXIII. the improved Cæsarean section and Porro's operation are brought up to date. Gastro-elytrotomy hardly deserves to be retained, especially as the gentleman who popularized it in this country has recently repudiated it. Winckel voices the opinion of modern surgeons, in thus concluding his description of the operation: "May these lines serve to hasten this operation once more to a silent burial. God protect us from any future resurrection! But much more may He guard the poor parturients with contracted pelves who seek help from us physicians!" In a new note on craniotomy *vs.* Cæsarean section (page 499), the author expresses his guarded opinion as a teacher of obstetrics, that "the time is probably not far distant when it will be possible to substitute the Cæsarean section for craniotomy within the limits of pelvic contraction under consideration" (under three inches). The section on uterine tumors complicating pregnancy contains much new matter, mostly surgical.

Chapter XXX., on eclampsia, has been carefully worked over and contains three pages more than the corresponding chapter in the former edition. In discussing the treatment of post-partum hemorrhage, due reference is made to Dührssen's method of intra-uterine tamponade and to the intra-venous infusion of saline solution. The paragraph on accidental hemorrhage is rather too condensed, considering the importance of the subject. It is of vital importance to distinguish between hemorrhage before and during labor, both from the standpoint of diagnosis and that of treatment, especially as regards the use of ergot.

Chapter XXXIII. bears evidence of careful revision—above all, the portion devoted to rupture of the uterus. It is interesting to note that the author now closes all extensive lacerations of the cervix immediately with a continuous catgut suture. Most obstetric surgeons would prefer wire or silkworm-gut under the circumstances—if they operated at all.

In the admirable concluding chapters on puerperal fever the most important addition occurs in the section on prevention, which deserves the careful consideration of every practitioner of midwifery. The author believes, as most fair-minded men now do, that for the occurrence of sepsis the attending physician has nearly always himself alone to blame, provided that he has had entire control of the case from the

beginning of labor. This is the only safe teaching for the student, and if it was insisted upon, puerperal fever would be practically eliminated. Several sentences deserve quoting, viz.: "True midwifery antisepsis consists not so much in douching as in furthering physiological processes." "Under normal circumstances, a proper handling of the patient during labor will effect more in the way of prophylaxis than the most effective germ-destroying agents." "In private practice they (prophylactic douches) are certainly needless." The author thinks that laparotomy may come to be a recognized method of treating puerperal peritonitis. He takes a conservative position with regard to curetting the uterus in septic endometritis.

The index is a model of its kind and fully merits the praise bestowed upon it in the preface.

It will be evident from this cursory glance at Dr. Lusk's book that it still remains not only a faithful mirror of modern midwifery, but a safe guide to the student. After a careful inspection of the work we are fully prepared to admit the truth of his statement: "In making needed alterations I have not felt it obligatory when new discoveries have destroyed the value of former deductions to retain these in order to maintain a reputation for consistency." H. C. C.

A System of Practical Therapeutics. Edited by Hobart Amory Hare, M.D., Professor of Therapeutics and Materia Medica in the Jefferson Medical College of Philadelphia, assisted by Walter Chrystie, M.D., formerly Instructor in Physical Diagnosis in the University of Pennsylvania. Vol. III., pp. xvi. 1352. Philadelphia: Lea Brothers & Co., 1892.

The third volume of this System commences with the subject of the treatment of "Diseases of the Skin," to which one hundred and fifty-four pages are devoted. The first chapter, by Dr. H. Radcliffe Crocker, treats of the "Disorders of Secretion and New Growths." This chapter, in many respects excellent, is marred by the lack of uniformity in the terminology of the prescriptions, although it is replete with useful information. The Inflammations are thoroughly and scientifically treated by Dr. W. A. Hardaway, whose work abounds in prescriptions, is complete and exceedingly modern. The treatment of acne is here repeated, and is more thoroughly done than when it was discussed under the heading of the first chapter. Dr. James Nevins Hyde goes over the "Therapeutics of the Hypertrophies and Atrophies" in a way that is eminently satisfactory. The concluding chapter upon the "Neuroses and Parasites," by Dr. Milton B. Hartzell, contains a thorough presentation of a comparatively few, instead of a multiplicity of, remedies, and the whole subject is treated in a manner creditable to the authors.

In the three hundred and sixty-six pages in which the "Therapeutics of the Diseases of the Mind and Nervous System" are expounded, the first paper, by Dr. Edward U. Brush, and the second, by Dr. H. M. Bannister, are devoted to Insanity. At first it seems unnecessary that the hospital should be considered apart from the medical treatment, yet both papers present so many interesting problems that they should claim earnest attention. Naturally the medical side of the question

involves a full dissertation upon narcotics and hypnotics. Dr. B. Sachs has written a far too brief paper upon the "Treatment of Chorea," but the excellence of the work diminishes the disappointment, and his bibliography makes the opportunity for further study an easy one. In the "Treatment of Epilepsy and Tetanus" Dr. J. Chalmers Da Costa has not presented any new facts, but gives a good presentation of the old. It is to be regretted that the brilliant work of Kitasato and Tizzoni upon the "Use of Antitoxin" was not more fully presented, although the reader is referred to a journal article upon that subject. Dr. M. Allen Starr has a very readable section upon the means at hand for alleviating Locomotor Ataxia, Acute Infantile Spinal Paralysis, Myelitis, and Amyotrophic Lateral Paralysis. The resources at the command of the author seem to be limited—a fact due, probably, to the unsatisfactory literature, and the trend of the paper is certainly not optimistic. We are disappointed in not finding mention of Bonuzzi's work in providing a substitute for suspension in locomotor ataxia. "Apoplexy, Brain Tumor, Spinal Tumor, Meningitis, Cerebritis, and Neuritis," are very satisfactorily presented by Dr. Charles K. Mills in a paper that is complete and modern. An article that will be of very great value to the general practitioner is that upon the "Remedies Used to Combat Disorders of Sleep," by Dr. Landon Carter Gray, which contains a wealth of therapeutic resources, presented clearly and vigorously, and is evidently the result of personal observation. The "Treatment of Headaches and Neuralgia," by Dr. Wharton Sinkler, is equally valuable, a classification that is readily comprehended, a table of remedies that does not bear the ear-marks of a therapeutic index, almost a monograph, yet in all points conciseness is prominent. This is not for a cursory perusal, but for thorough study. Dr. C. Eugene Riggs presents the "Methods for the Relief of Nervous Disorders and Paralysis from Excessive Use of the Parts Affected, Vertigo, Tremor, and Lead-poisoning," in a very satisfactory way. In the "Treatment of Cerebral Concussion and Shock," by Dr. Joseph Ransohoff, we do not find anything that is new, but the work is complete. Dr. T. D. Crothers, in the chapter on "Morbid Habits," reiterates his well-known views, and gives us a temperate and thorough study of a subject concerning which he speaks as a master, commanding attention and respect. The final paper upon "Localized Spasms; Localized Palsies; Facial Hemiatrophy," by Dr. F. X. Dercum, is brief, but contains the best of the existing knowledge.

The section upon "Diseases of the Genito-urinary Apparatus" covers three hundred and thirty-eight pages. The chapter upon the "Treatment of Nephritis, Pyelitis, Phosphaturia, Chyluria, Albuminuria, Lithuria, Oxaluria, and Diabetes Insipidus," by Dr. Andrew H. Smith, shows upon every page the results of careful observations in an extentensive field. Plainly written, committed to no hobbies, sound in doctrine, showing great therapeutical resources, it is a paper well worth careful study.

The "Treatment of Gonorrhœa and its Complications; Stricture; Cystitis; Hypertrophy of the Prostate; Atony of the Bladder; and Vesical Calculus," by Dr. J. William White, is fully in accord with the brilliant reputation of the author. Dr. Edward Martin has given the profession an interesting paper upon the "Diseases of the Prepuce, Glans Penis, and Testicles." The "Diseases of the Vulva and Vagina (non-venereal), and Leucorrhœa" are the subject of an illustrated

article by Dr. T. J. Watkins. At the present time, when there exist so many special treatises, this paper, in a System, hardly seems to be satisfactory.

Dr. R. L. Dickerson has found it possible to present a really novel and instructive paper upon the "Diseases of the Uterus." His discussion of the feminine apparel, illustrated, is clear and logical, and after reading his work we cannot but feel that it is remarkable that the profession has gotten on without such a study as this. Every gynecologist should give it his earnest attention.

"Amenorrhœa, Dysmenorrhœa, Menorrhagia, and Sterility," by Dr. Hunter Robb, shows study and careful observation; indeed satisfactory, were it not for the very badly done photographic representations.

The "Treatment of Diseases of the Broad Ligaments, Tubes, and Ovaries," by Dr. Howard A. Kelly, may seem to the average practitioner to be surgical rather than medical, yet we believe it to be based upon sound practice and to be temperate and judicious. It is precisely the view that should be placed before the profession. Dr. Barton Cooke Hirst has added to his reputation by the very excellent paper upon the "Diseases of Pregnancy, Parturition, and of the Puerperium; Extra-uterine Pregnancy, and Abortion."

The "Treatment of the Diseases of the Eye" occupies three hundred and twenty nine pages. Dr. W. F. Mittendorf presents the general consideration in his well-known practical style. The "Diseases of the Conjunctiva, Sclera, and Cornea," by Dr. George E. de Schweinitz, is a thoroughly good paper. "Diseases of the Iris and Ciliary Body; Sympathetic Affections," by Dr. Charles J. Kipp, receive careful study. A paper otherwise excellent is marred by illustrations of instruments that with few exceptions do not present any novel features. An instrument-maker's catalogue sent out with the System would be preferable. Dr. S. C. Ayres has a very complete presentation of the "Diseases of the Optic Nerve, Retina, Choroid, and Vitreous; Amblyopia and Amaurosis." A far too brief but excellent paper is that of Dr. Swan M. Burnett upon the "Diseases of the Lens, and Glaucoma." The work entrusted to Dr. Henry Gradle upon the "Diseases of the Orbit, Lachrymal Apparatus, and Eyelids," does not give much opportunity for originality; but he has been thorough and practical. In the two following papers: "Diseases of the Ocular Muscles, Paralytic and Concomitant Squint, Asthenopia, Spasms of the Ocular Muscles, and Nystagmus," by Dr. Lucien Howe, and that upon "Optical Therapeutics; Normal and Abnormal Refraction; Presbyopia; Principles involved in Fitting Glasses," by Dr. Edward Jackson, we expect repetition, nor are we disappointed. Yet both papers are excellent and should be carefully read. The question of muscular insufficiency is fairly presented; although neither side of those holding extreme views will be satisfied, yet the justice of the author should be acknowledged. Dr. F. Buller concludes with a very complete article upon the "Injuries of the Eye and its Appendages."

The methods of treatment of the "Diseases of the Ear" cover eighty-five pages. Dr. B. Alexander Randall takes up the "Diseases of the External Ear and Tympanic Membrane," and furnishes a very satisfactory contribution. A paper for the general practitioner to thoroughly digest is that upon the "Acute Diseases of the Middle Ear," by Dr. Robert Barclay, which is clearly written, contains an excellent bibliog-

raphy, and is indeed a notable paper. Dr. Samuel Sexton makes a logical plea for Schwartze's operation, of which he has been a distinguished advocate, in the treatment of "Chronic Purulent Disease of the Middle Ear." The final paper, and a very excellent one, is by Dr. Charles H. Burnett upon "Chronic Catarrh of the Middle Ear and Diseases of the Internal Ear," brings to a fitting close this volume. The index to the third volume is very complete; the general index is hardly satisfactory, but is probably extensive enough for reference.

In reviewing these three volumes we feel great satisfaction that we have a "System of Therapeutics" so faithfully recording the advanced position held by the profession in this country. We believe that no System shows the practical bearing of medical education better than this. We congratulate the editor and as well the profession upon the rapid completion of the three volumes, and we believe that this work is more valuable than any of the other Systems. After exploring this vast mine of information and utilizing the resources furnished, criticism may seem captious, but from our careful reading we only note that the editor might have exercised his prerogatives more freely. The work is a monument of industry, a storehouse of information, and a credit to the American profession. R. W. W.

DIFFERENTIATION IN RHEUMATIC DISEASES (SO CALLED). By HUGH LANE, L.R.C.P., M.R.C.S., Surgeon to the Royal Mineral Water Hospital, Bath; Hon. Medical Officer to the Royal United Hospital, Bath. Second edition. Pp. xii., 121. London: T. & A. Churchill, 1892.

HYDROTHERAPY AT SARATOGA. By T. A. IRWIN, M.A., Cambridge, Eng.; M.A., M.D., Dublin University; M.R.C.S. Eng., etc. Pp. 264. New York: Cassell Publishing Co., 1892.

MR. LANE has written a very interesting little book, in which he lays great stress upon the differential diagnosis between chronic rheumatism, chronic rheumatic arthritis, rheumatoid arthritis, and chronic gout. He believes that cases of rheumatoid arthritis should be carefully distinguished from the conditions resembling it; that it has its constitutional cause in a combination of the hereditary taints of gout and phthisis; that it presents certain constitutional general symptoms, of which debility is an important one; that it has many neurotic symptoms; that its last stage is osteo-arthritis. The medicinal and dietetic treatment for the conditions which are considered in this book, are alone set forth, but we do not find any decided variation from the usual procedures. On the other hand, the chapters devoted to the administration of the baths at Bath, the mineral thermal water treatment, are complete, moderate in tone, concise, and of very great value. Seven plates, although not worthy of great praise when considered from an artistic standpoint, very accurately illustrate the conditions described in the text. The book is an important one, in that it shows that much can be accomplished in affording relief and, indeed, in curing patients suffering from these rebellious diseases. A careful study of it will clear up many points in diagnosis and lead to more accurate and appropriate therapeutics.

DR. IRWIN has endeavored to establish among educated readers a correct and unprejudiced valuation of mineral waters generally, and those of Saratoga in particular. This book, therefore, is not intended exclusively for professional readers, but on that account is none the less valuable even to a medical man. Written in an entertaining style, it is as far from the optimistic tenor of the average spa publication as it is from the pessimistic teachings of the usual therapeutical text-books. In fact, he states that mineral waters are in no sense specifics; judiciously selected, and carefully administered, they are, without exception, the safest and most efficient correctives of the morbid constitutional conditions common to most forms of chronic disease, hence they have a wide range of indirect curative power. In these days of reckless statements regarding hydro-therapeutic measures, the calm, fair, and dispassionate statements of this work should be appreciated. We regard this as a real contribution to medical literature. R. W. W.

HOW TO FEEL THE PULSE AND WHAT TO FEEL IN IT. PRACTICAL HINTS FOR BEGINNERS. By WILLIAM EWART, M.D. Cantab., F.R.C.P., Physician to St. George's Hospital, etc. With twelve illustrations. 8vo., pp. xv, 112. New York: William Wood & Co., 1892.

THIS little book of some hundred pages will be found to be of great assistance not only to beginners, for which class of students the author intends it, but also to those more advanced in the study of medicine.

As stated in the preface, the subjects dealt with are treated of in an elementary manner. This is especially manifest in the first chapter, which the author, rather tediously and with a minuteness of detail which seems somewhat unnecessary, devotes to the consideration of the different methods of observing the pulse in the various arteries adapted to its study. To estimate the pulse-rate per minute it is recommended that the pulse-beat be counted for fifteen seconds and the result multiplied by four. While this is undoubtedly the routine practice of many, and answers very well in cases with which we are familiar, yet in examining a patient for the first time a longer period should be devoted to the counting of the pulse, as in certain cases no irregularity of pulse-beat will be detected within so short a time as fifteen seconds, whilst a count for a full minute will reveal some irregularity for which a close investigation will disclose a cause.

With the subsequent chapters the character of the book changes and each line is pregnant with interest and instruction.

Chapters II., III., and IV., respectively, treat of "Elementary Notions on the Physiology of the Pulse," "The Chief Qualities and Variations of the Normal Pulse," "The Chief Abnormalities of the Pulse," and deserve the close attention of the student.

Especially interesting is Chapter V., dealing as it does with "The Six Chief Morbid Pulse Types. How to Test the Pulse as to Tension" Under the heading of the six chief morbid pulse types, the author includes the pulses of high and low arterial tension and the pulses supposed to be characteristic of the four cardiac valvular lesions, and he

rightly states that the student should not rest until he has been given an opportunity of feeling each of these pulse types.

In testing for synchronism in the two pulses, as pointed out in Chapter VI., the author advises the use of the one-hand method on account of the different delicacy of touch usually possessed by the two hands. In this method the patient's hands are crossed in front of him so that "the right wrist is nearest to his chest and the left wrist immediately in front of the right, and therefore nearest to the observer. The latter now grasps both wrists under his right hand, the left wrist fitting in between the thumb and index, whilst the three remaining fingers reach over the radial border of the right arm." The fixation of the two wrists is thus managed by the thumb and the ring and little fingers, whilst the index and middle fingers are used to find the two pulses.

Chapter VII. considers the subject of "Capillary Pulsation," for the determination of which the author advises the following methods:

1. The "tache" method.
2. The "lip" method.
3. The "nail" method.

These various methods are fully described, the author appreciating the value of capillary pulsation as a sign of aortic regurgitation in cases where the diagnosis would otherwise remain doubtful.

In Chapter VIII. the subject of "Venous Pulsation" is briefly, but instructively, studied.

The book possesses no index, but each chapter is subdivided into short paragraphs with special headings, so that an index is rendered unnecessary. There is also a full "Table of Contents," and the author has appended a glossary of terms, both English and Latin, which are connected with the nomenclature of the subject treated of. T. G. A.

HOSPITALS AND ASYLUMS OF THE WORLD: THEIR ORIGIN, HISTORY, CONSTRUCTION, ADMINISTRATION, MANAGEMENT, AND LEGISLATION. By HENRY C. BURDETT. Volumes I. and II.: Asylums—History and Administration; Asylum Construction, with Plans and Bibliography. London: J. & A. Churchill, 1891.

THE first two volumes of this splendid work form a most important contribution to the literature of hospitals and asylums. The ample experience and wide research of the author are well shown in his thorough treatment of the subject in hand. Incidentally, much that is of interest to the student of sociology and philanthropy is embodied in the first volume, in which the evolution of the treatment of insane patients is described. Here, as so often, modern science has been anticipated by ancient wisdom, and the humane and temperate treatment of insane persons which a knowledge of the pathology of insanity has brought about, is shown to be but a return to the earlier method, in vogue before religious superstition introduced the terrible belief in demoniac possession. The narration of the cruelties of this period is a portion of the history of the Inquisition, and more need not be said to suggest its horrors.

The succeeding portion of these volumes is of the greatest value to those who have to do with hospitals and asylums. Their management is given with such clearness and thorough knowledge of detail that a mine of information is placed before the reader. Full justice has been done to American institutions, and credit is given to American alienists, many of whom are in the front rank in the originality and careful study of their administration.

The publishers have done ample justice to the subject-matter, and illustrations are abundantly and well furnished.

We shall welcome the succeeding volumes of this valuable work with interest and pleasure. E. P. D.

THE FIRE PROTECTION OF HOSPITALS FOR THE INSANE. By L. H. PRINCE, M.D., Resident Physician "Bellevue Place," Batavia, Ill., etc. Chicago: C. H. Blakeley & Co., 1891.

WHEN we learn from Dr. Prince's book that in the twenty years prior to its publication 241 insane patients lost their lives in fires in insane hospitals, we appreciate better the need for such instruction in this branch of hospital administration. No one who has not been a hospital official can appreciate the dread of fire which forms a considerable part of his weight of care.

Before entering his medical career, Dr. Prince had ample opportunity to learn practically the best methods of fire service. He has given us the benefit of practical knowledge, in a clear and methodical manner. The choice of appliances, the best methods of hospital construction and administration, and the organization and instruction of officials in fire drills are clearly stated.

No hospital or asylum should be without the book, and none can honestly neglect to follow its teaching. E. P. D.

A TREATISE ON BRIGHT'S DISEASE OF THE KIDNEYS: ITS PATHOLOGY, DIAGNOSIS, AND TREATMENT, WITH CHAPTERS ON THE ANATOMY OF THE KIDNEY, ALBUMINURIA, AND THE URINARY SECRETION. By HENRY B. MILLARD, M.A., M.D., Fellow of the Academy of Medicine of New York, and of the American Academy of Medicine; Foreign Corresponding Member of the Academy of Medicine of Paris, of the Royal Academy of Medicine of Rome, of the Verein Deutscher Aerzte of Prague, of the Société d'Hydrologie Médicale of Paris; Honorary Member of the Société Anatomique of Paris, etc. With numerous original illustrations. Third edition, revised and enlarged. New York: Wm. Wood & Co., 1892.

THIS, the third, edition of the author's book is rendered necessary by the many new facts that have been discovered, and the changes that opinion has undergone upon various points since the appearance of its predecessors. The arrangement is nearly the same as that of the two

preceding editions, the earlier chapters being devoted to a discussion of the anatomy of the kidney and to the nature and sources of the constituents of the urine. A chapter is well devoted to the vexed question of the significance of albumin in the urine of the apparently healthy. In regard to this matter the author expresses his view in positive terms by stating that "thus far albuminuria has not been shown to exist physiologically," and explains the results obtained by many able authorities, who hold the opposite view, by the use of faulty methods of investigation. In a large number of examinations of the urine of patients without any renal difficulty, he has failed to find even a trace of albumin. He describes the method of testing employed by him as follows: In doubtful cases the urine is first filtered through *Swedish* filter-paper, owing to the fact that the gray French paper gives a reaction of albumin with the test that is usually known by the name of our author—the phenic-acetic acid and potash test. Should the filtrate still remain cloudy, the author resorted to boiling with liquor potassæ. Heller's, Tanret's, or the author's own test were then employed, the mucin reaction given by the last two being borne in mind.

The author believes that mucinuria has been frequently miscalled "physiological albuminuria," especially in those experiments which appeared to show the latter condition after long marches. To again quote our author: "Turn, therefore, which way we may, we cannot satisfy ourselves that albuminuria, either natural or artificial, ever occurs except as a result of pathological changes in the kidney, and is, consequently, never normal or physiological—never, therefore, to be regarded without distrust."

The chapter upon the tests for albumin in the urine is deserving of careful perusal. The author mentions but to reprehend the absurd practice of stating that urine contains such quantities as fifty per cent. of albumin as a result of boiling. This statement, so frequently made in spite of the fact that many have spoken of its loose, inaccurate, and misleading character, is still seen far too often. It is a matter of regret that in this connection the author makes no mention of Esbach's albuminometer—an apparatus that is simple, cheap, and readily manipulated, and the results from which are far more definite than those obtained by judging of the bulk after boiling, or the thickness of the ring in the contact-tests.

The reagents especially advocated are nitric acid, heat, nitro-magnesian fluid, Tanret's solution, and that composed of phenic-acetic acid and potash. A full discussion of the merits, demerits, and method of using each test follows. The nitro-magnesian test is held in higher esteem than it is by most writers on this subject, it being stated by our author that by this reagent albumin had been discovered by him where a negative result had followed the use of all other tests save his own and that of Tanret. The proportions of albumin detected by the various reagents mentioned are thus given: Nitric acid, 1 in 100,000; heat, 1 in 100,000; Tanret's, 1 in 200,000; Millard's, 1 in 200,000.

The presence of casts in the urine is considered by Millard as an absolute sign of disease of the kidneys; and the epithelial cells of the tubules are thought by him to be always destroyed in the formation of these bodies, their place being occupied by endothelial cells from the structureless membrane of the tubules.

In the short chapter devoted to the technique of the examination of

urine for the detection of casts and kidney epithelial cells, there are certain practical points that might have been added in order to enable the inexperienced to more surely find casts, should they be present in small number. The use of a small camel's-hair brush, as advocated by Millard, surely cannot be either safer or more convenient than that of the ordinary glass pipette or dipping-tube, while the latter has the advantage of allowing us to collect the *sediment* of the sediment merely by standing the pipette upon the object-glass until a sufficient time has elapsed for all solid material to gravitate to the point of the tube. No mention is made by the author of the necessity for a *moderate* amount of substage illumination, or of employing a low-power objective before making use of a high power. That casts are frequently seen *through*, owing to the use of too high a degree of illumination, is undoubted; while the appearance of casts under low powers is as distinctive as under a highly magnifying objective, if not more so.

The author's classification of the forms of nephritis is open to objection for many reasons. The main divisions into which the inflammatory diseases of the kidney are separated are: I. Croupous; II. Interstitial; and III. Suppurative. So far so good, if we do not find fault with the term croupous as opposed to catarrhal. The author states his belief that the waxy and fatty kidney are "simply an intercurrent or subsequent development upon one of the above forms, and not a condition independent of other lesions of the kidney." He "regards the first two (croupous and interstitial) not as essentially distinct diseases of the kidneys, but as identical in character, but differing in the degree in which the connective tissue and the epithelia are respectively affected." The first of these propositions can hardly be considered as proven, inasmuch as the waxy (amyloid?) kidney is merely a part of a general change of bloodvessel walls throughout the body, and by no means a result of inflammatory changes in the kidney itself or alone. That the lesions of nephritis may also be present does not affect the question at all, in that the kidney with diseased bloodvessels can readily be conceived to be excreting materials that would be of an irritating character. In regard to the "fatty kidney," the author has more reason upon his side, as the fatty degeneration is due to either the cutting off of blood-supply from the cell elements by inflammatory processes, or else to mal-nutrition from poverty of the blood in nutrient constituents.

It is difficult to see any reason for the substitution of the term "croupous" for "catarrhal" nephritis, and the former is so apt to give rise to confusion that it would seem to the reviewer to be far from desirable as a term to denote the form of acute nephritis wherein the parenchyma was involved.

Under the heading of etiology of "croupous" nephritis the author reports a very interesting case wherein the ingestion of large quantities of essence of ginger upon two occasions caused acute inflammation of the kidney. This is certainly unique. The etiological importance of malaria in its relation to acute nephritis is justly the recipient of some remarks by the author.

In regard to the etiology of nephritis occurring during pregnancy, the author believes that there is no connection proven; but that, as a rule, this should be called, not the nephritis of pregnancy, but nephritis *during* pregnancy.

An excellent parallel-columned table of the diagnostic points between

chronic croupous and chronic interstitial nephritis is given, this being the best of the kind that has fallen under our notice.

The author's heading for Chapter XVII. is "Catarrhal or Interstitial Nephritis," although he, under protest, uses the latter name in the text in deference to usage. It seems to us that the two terms, "catarrhal" and "interstitial," cannot be properly applied to the same simple process, one implying a pathological process in the epithelial cells, the other a lesion of the intercellular connective tissue. This fact is recognized by the author, but he evidently regards the process as by no means applying chiefly to the latter constituent of the organ.

The author opens the chapter entitled "Acute and Chronic Interstitial Nephritis" with the statement that the form of nephritis designated by Charcot "primitive interstitial nephritis," has an acute beginning, and that there is an acute form. This is rather ambiguous, owing to the classification adopted by the author. Any arrangement by which interstitial nephritis, or rather the disease usually known as such, can be placed near to the form usually known as acute interstitial or suppurative nephritis, must be faulty, save possibly upon purely anatomical grounds. When we consider the wide separation of the two conditions as regards etiology, diagnosis, prognosis, and treatment, it is difficult to see any reason for placing them together. That chronic interstitial nephritis must have a beginning is, of course, true; but it by no means follows that it has an acute beginning. So that we can here see the faults of such a classification as that adopted by the author. He, however, makes this statement, which will probably startle many who have adopted the more usual classification: "The etiology of acute and chronic interstitial nephritis, and the characteristics and features of the two diseases, are so much alike that it is unnecessary to multiply divisions by considering their causes separately" (p. 160). After this it was impossible for the reviewer to think otherwise than that he had entirely failed, after careful study, to grasp the author's distinction between the different renal lesions.

Upon page 174 the author states that repeated attacks of croupous nephritis resulting from pregnancy may develop chronic interstitial nephritis, by which it is presumed that he means (to use the usually accepted terms) that repeated attacks of acute catarrhal nephrits resulting from pregnancy may develop chronic catarrhal nephritis.

It is, therefore, feared by the reviewer that he must have failed to fully appreciate the system of classification and nosology adopted by the author.

The chapter upon nephritis without albuminuria is by far the most powerful one in the book, and will well repay careful study. Many cases are recited showing that such a condition may exist, and no one can fail to be impressed with the necessity for careful consideration of all the features of a case before concluding that Bright's disease is absent simply because albumin cannot be found in the urine. That this precaution is far too often neglected is undoubtedly true.

In the matter of treatment, the same difficulty in grasping the author's system of nomenclature is found to interfere much with the advantage to be derived from the perusal of this portion of the work. For instance, under the heading of treatment of acute nephritis the author recommends, as an alkaline diuretic, Trousseau's diuretic wine, which contains juniper and squill among other ingredients. If by acute nephritis

the author means the form wherein large amounts of albumin are passed in the scanty urine, and blood corpuscles, hyaline, epithelial, and blood casts are found in the sediment, we cannot see any justification for prescribing such irritants to the kidneys as are the two substances named. By far the greatest stress, in considering the treatment of this condition, is laid upon the hot bath and the use of the two chlorides of mercury. Cantharides is said to have been found of use in acute croupous nephritis, but probably few men would have the hardihood to prescribe such an active renal irritant in an acute inflammatory condition of the kidney. In regard to the use of opium and its derivatives in acute nephritis, the author expresses himself with more caution than has been the case with many writers of recent times.

A very full and valuable description is given of the various springs and health-resorts that may be beneficial to sufferers from Bright's disease.

Were it not for the confusion in classification and nomenclature adopted by the author, which we have said to be possibly owing to our own obtuseness, this book would well repay a careful perusal.

F. A. P.

DISEASES OF THE NERVOUS SYSTEM. By J. A. ORMEROD, M.D. Oxon., F.R.C.P. Lond. With numerous illustrations. Philadelphia: P. Blakiston, Son & Co., 1892.

DR. ORMEROD has written a systematic work on diseases of the nervous system in a little more than three hundred small pages. This, of itself, is a notable feat, especially as the book contains chapters on normal and morbid anatomy, general and special symptomatology, and methods of investigation, consuming almost two hundred pages. This apportionment of space leaves about one-third of the book, which altogether is only about the size of a large monograph, for a clinical description of nervous diseases. Our first impression was that Dr. Ormerod could not do it; and our final impression is that he has not done it. It is hard to understand why the author, who is evidently well qualified, cast his book in its present shape. It is correct, but commonplace; brief, but bald; unsatisfactory as a reference-book to the advanced clinician, and not sufficiently instructive to the student and young practitioner. The best part of it is the anatomical description, which is clear and concise, and quite as full as the average reader is able or willing to accept.

The clinical part has many sins of omission, which is the fault of Dr. Ormerod's method rather than of his knowledge. The effects of lead upon the nervous system, as we have observed them, cannot be described in one small page; in his attempt to do so the author ignores entirely lead encephalopathy. That rare but most important disease, subacute anterior poliomyelitis, of which we have recently seen a fatal case in the Philadelphia Hospital, ought not to be dismissed in four lines.

We hope that Dr. Ormerod will revise and enlarge his book. There is undoubtedly some demand for a concise treatise on neuro-pathology—something not so diffuse as Gowers, but more nearly complete than Ormerod.

J. H. L.

PROGRESS

OF

MEDICAL SCIENCE.

THERAPEUTICS.

UNDER THE CHARGE OF

REYNOLD W. WILCOX, M.A., M.D., LL.D.,

PROFESSOR OF CLINICAL MEDICINE AT THE NEW YORK POST-GRADUATE MEDICAL SCHOOL AND HOSPITAL; ASSISTANT VISITING PHYSICIAN TO BELLEVUE HOSPITAL.

The Diseases and Conditions to which the Rest Treatment is Adapted.

Dr. Wharton Sinkler prefaces his paper with an excellent *résumé* of the rest treatment. The most satisfactory results are usually obtained in hysteria and neurasthenia. In locomotor ataxia much good has followed prolonged rest; by this method spastic paraplegia has been benefited. Neuralgias, as sciatica, neuritis, peripheral neuritis, and migraine all are conditions likely to improve. Mental diseases, when dependent upon malnutrition, the nervous exhaustion of melancholia and mania, although open-air exercise may be important, are apt to be benefited.

Chorea and epilepsy may be improved, but in the latter instance it is not likely to be permanent. Alcoholism and the opium habit have been successfully treated. Uterine diseases yield, sometimes, as readily as to operative interference. Albuminuria and lithæmia, particularly when the latter gives rise to migraine and neuralgias, and certain forms of neurasthenia, are markedly improved. Graves' disease is much benefited, absolute rest being the most effective means of quieting the heart's action.—*Journal of Mental and Nervous Diseases*, 1892, No. 5, p. 321.

The Therapeutic Action of Digitalis.

Dr. M. Masius endeavors to show that not only can this remedy be taken without inconvenience in doses which are considered as poisonous, but these massive doses prevent, surely and rapidly, the dangers arising from cardiac weakness and elevation of temperature. He has used sixty grains in infusion, as a daily dose, for the past year, not only as a remedy for signs of cardiac insufficiency, in diseases the most diverse, but especially in diseases of the heart and in pneumonia. He finds that the action is produced very rapidly,

in less than twenty-four hours; that the circulation is improved, the dyspnœa becomes less; that the amount of urine is increased, the œdema disappears; that there are no symptoms of intolerance. In support of his position he cites twenty-four carefully observed cases, and reproduces the sphygmographic tracings. He concludes that in the dose above mentioned, this drug acts as a cardiac tonic, in increasing the energy, in regulating the beats, and, consequently, in combating the venous stasis, the œdema, the dyspnœa, and all symptoms which are the consequence of cardiac insufficiency. It reduces a febrile, but has hardly any effect upon a normal temperature. The rapidity of action varies according to whether or not there exists a febrile condition. In febrile infectious diseases, as pneumonia, this drug ought to combat not only the cardiac weakness, but as well the effects of temperature and the products of the infectious agent. When cardiac weakness is the only cause the action of digitalis is more rapid. There are, besides, individual differences. In the dose prescribed it is a real cardiac remedy; this tonic action requires about thirty-six hours, the limit being twenty-four to forty-eight; this dose should be continued for three or four days, but the duration varies in individual cases, and requires careful watching. This method does not appear to create digestive disturbances more frequently than small doses, nor to favor the appearance of the period of paralysis; nor is the cumulative action especially to be feared.

The effect of the remedy is usually felt for from three to seven days after the cessation of its administration. In pneumonia it has a favorable action only upon the heart and the temperature; in the several observed cases the crisis was produced in from the fifth to the twelfth day—that is to say, within the ordinary limits; it does not prevent the unfavorable termination in particularly grave cases.—*Bulletin de l'Académie Royale de Médecine de Belgigue*, 1892, No. 4, p. 265.

The Value of Injections of Thyroid-juice of Dogs After Removal of the Thyroid Gland.

Dr. Rodolfo Schwarz, having studied the writings of Vassule, Brown-Séquard and Arsonval, Eley, Conizzaro, and Murray, concludes that the intra-venous injection of thyroid-juice has no value in preventing or in arresting an existing tetany in a dog, after complete extirpation of the gland. The intra-peritoneal injections gave the same results. Since the symptoms that are consecutive to thyroidectomy (cachexia strumipriva) depend upon the absence of the functions of the gland, experiments show that these injections cannot take the place of this function, nor, indeed, can they arrest or render less intense the symptoms of tetany.—*Lo Sperimentale*, 1892, fasc. 1, p. 19.

The Subcutaneous Injection of Blood, and a Simple Method of Intra-venous Transfusion.

Dr. v. Ziemssen, after a careful review of the literature, delivered a notable address at the Congress for Internal Medicine, at Leipzig. He advises injections into the thighs, each syringeful into a new point, two assistants only being required, one to take the blood from the veins, the other for

the massage, which should be thoroughly done. From a considerable number of observations he believes that there is no clot-formation; it does not give rise to fever or hæmoglobinuria; the amount of fourteen ounces can be injected, nor is there any injury to the tissues, while the percentage of hæmoglobin can be increased by ten or fifteen. On the other hand, there are two reasons for intra-venous transfusion, one the rapidity with which the effect is obtained, and, secondly, the avoidance of pain from the hypodermatic injections. He recommends also, however, transfusion from vein to vein through the syringe, thereby avoiding the possibility of the entrance of air into veins, the necessity for narcosis, and the opportunity for a pathological reaction.—*Münchener medicinische Wochenschrift*, 1892, No. 19, S. 323.

Further Observations on the Influence of Calcium Salts in Promoting Heat-coagulation of Albumins.

Dr. Sidney Ringer has carried out some experiments at the Physiological Laboratory of University College, London, to determine the influence of calcium salts on a native albumin—namely, white of egg. He made one-tenth of a one per cent. neutral solution of calcium chloride, or of calcium nitrate; the egg albumin was dissolved in distilled water (1:8). He believes that these, and probably other soluble salts of calcium, have no influence on the heat-coagulation of egg albumin unless it is first converted into alkali albumin. He summarizes his observations as follows: 1. Calcium salts do not promote heat-coagulation of albumin. 2. They cause heat-coagulation of alkali albumin. 3. In some solutions they act, partly, by lessening the alkalinity of the solutions. 4. They have a further and more powerful action, for they precipitate alkali albumin in strongly alkaline solutions. Whether they act by diminishing the solvent power of the menstruum, or whether they alter the proteid molecule and so render it soluble, these experiments do not explain.—*Journal of Physiology*, 1892, No. 3, p. 300.

Oxychinaseptol or Diaphtherin: A New Antiseptic.

Prof. R. Emmerich gives an intelligent paper upon this new claimant for recognition, showing the relationship between phenol, cresol (with addition of CH_3, a methyl group), oxychinolin, methyoxychinolin, and, finally, when to the phenol, or sulphur group, SO_3H is added, we obtain aseptol, of greater antibacterial power. Thus we have the subject of the paper, which is really a combination of two molecules of oxychinolin and one of aseptol, of the formula $HO.C_9H_6NH.O.SO_2.C_6H_4.O.NHC_9H_6.OH$. Chemically, we would expect a high antiseptic power. Comparative bacteriological experiments, using lysol, carbolic acid, and phenol, show its superiority. On the other hand, it tarnishes metallic instruments, which, however, when its value as an antiseptic is taken into consideration, is of minor importance.

Dr. Kronacher has used this substance in surgical practice in 30 to 50 per cent. solutions, the cheaper form being as a powder. He finds it soluble in both cold and warm water, and that it does attack nickel-plated instruments; less, however, if they are new. The hands are stained a pale-yellow, the odor is slightly that of phenol. The solution usually employed is 1 per

cent., variations from ½ to 2 per cent. being allowable. It apparently is not caustic, nor does it give rise to eczema. The testimony is favorable to the possession of marked antiseptic properties, with no marked disadvantages.—*Münchener medicinische Wochenschrift*, 1892, No. 19, S. 325.

The Therapeutic Action of Diuretin.

Dr. Eugene Frank, from a careful clinical study of this remedy, concludes that it does not have a cumulative action. Although with the increase of the amount of urine the specific gravity falls, often to below 1010, yet the daily amount of solids is increased. Its influence upon the amount of albumin is by no means a constant one; generally, however, in chronic nephritis, the amount is dimished. In two cases of chronic nephritis, casts disappeared from the urine, yet that this remedy irritates the kidneys can be determined both from the microscopic examination of the urine as well as from the results of necropsy. In dropsy, *i. e.*, œdema, ascites, and hydrothorax, with the increase of the amount of urine there is either a complete disappearance or a marked improvement. Occasionally a profuse diarrhœa, which is apparently produced by the remedy, will assist in the removal of the transudation.

After carefully weighing the evidence, he believes that the drug has a direct influence upon the action of the heart, yet it is most marked during the persistence of the œdema, and is not, as is the case with digitalis or strophanthus, continued after the disappearance of this symptom. Hence it is quite proper to use both remedies, each for its especial purpose.—*Prager medicinische Wochenschrift*, 1892, No. 13, S. 137.

Exalgine.

Dr. John Gordon prescribes this remedy in four-grain doses dissolved in compound tincture of cardamom and syrup of orange, repeated every four hours. It seems to abolish pain without interfering with tactile sensation, and it does not prevent the patient from attending to his daily duties. Its action seems chiefly to be in those parts of the nervous system which have for their function the perception and conduction of painful sensations, and it does not diminish general sensibility. Disagreeable sensations have been remarked when the dose has been more than six grains; cerebral disturbance, feelings of intoxication, dizziness, buzzing in the ears, nausea, vomiting, and headache. He reports cases of facial neuralgia, toothache, headaches, lumbago, intercostal neuralgia, otitis media, sciatica, locomotor ataxia, and rheumatoid arthritis. Of sixty-six patients treated, this remedy relieved the pain of fifty-five. The most marked results were obtained in nervous headache, facial neuralgia, intercostal neuralgia, and lumbago.

Dr. T. Churton reports the successful use of this remedy in a case of Graves' disease, when administered in half-grain doses every quarter-hour until three doses were taken. By mistake she took four grains every quarter hour, that is twelve grains within half an hour, complaining only of gastric pain and burning. A woman suffering from toothache took twenty-four grains in half an hour. The symptoms were that she felt dazed, walked un-

steadily and with difficulty, feared to speak lest she should say foolish things, felt giddy and stupid, slept for nine hours, awakening with a dry mouth and frontal headache.—*Lancet*, 1892, No. 3587, p. 1173.

[In spite of these cases we must believe that exalgine is a remedy to be used with caution, and that four grains should be considered to be a dose which should not be exceeded without careful observation of the patient. The cases of poisoning, reported with increasing frequency, are too numerous to be ignored.—R. W. W.]

Phenocoll Hydrochoride.

Dr. Rudolph Bum, having carefully studied the papers of Hertel, Herzog, and Cohnheim, furnishes his observations of the use of this remedy as: 1. An antipyretic in hectic fever (phthisis pulmonum and pleuritis tuberculosa) and in erysipelas. 2. An anti-rheumatic. 3. An anti-neuralgic in myelitis, sciatica, and cephalalgia (migraine). As an antipyretic it is powerful, almost safe, in phthisis, although it should be used in seven-grain doses. In erysipelas it is not so powerful an antipyretic, being most useful at the acme or in falling temperature, and its action is marked by profuse perspiration. As an anti-rheumatic it is ineffective for the process itself, and shows only a moderate antipyretic action. As an anti-neuralgic good results were obtained with seven-grain doses in migraine, while in myelitis and sciatica it was ineffectual. Untoward symptoms on the part of the digestive tract or heart were only occasionally met with.—*Wiener medizinische Presse*, 1892, No. 20, S. 794; 22, S. 890.

The Clinical Investigation of Phenocoll Hydrochloride.

Dr. P. Balzer has treated thirty cases with this remedy, and has recorded his observations regarding its value as an antipyretic, anti-rheumatic, anti-neuralgic, and upon the healthy its influence upon nitrogen excretion, and upon the pulse. He concludes: 1. With the exception of two cases of cyanosis, without, however, threatening symptoms, phenocoll in daily dosage of sixty to ninety grains has shown no unpleasant after-effects. 2. Phenocoll in doses of fifteen grains is a valuable and promptly acting antipyretic, but as such it possesses no advantage over phenacetine or antipyrine. The antipyretic effect is usually accompanied by a slowing of the pulse, but not in proportion to the lowering of the temperature. 3. In daily doses of from sixty to ninety grains it is an active anti-rheumatic, and when salicylic acid is contra-indicated, can be substituted for it with advantage. 4. As an anti-neuralgic it is recommended for those cases which arise from cold. 5. While its influence upon the pulse curve is not determined, it is evident that in healthy individuals it increases the nitrogenous excretion.—*Therapeutische Monatshefte*, 1892, No. 6, p. 289.

The Embellate of Ammonia as an Anthelmintic.

Dr. Giusto Coronedi has studied this preparation, which is derived from the seed of *Embellia ribes* (Nat. ord., *Myrsinaceæ*). The symbol of embellic acid is $C_9H_{14}O_2$; it is insoluble in water, does not decompose on prolonged boiling with sulphuric or hydrochloric acids, and forms salts with sodium,

potassium, and ammonium ($C_9H_{13}O_2NH_4$), the latter appearing as crystals, or an amorphous powder, of a rose color, slightly soluble in cold water, and forming with diluted alcohol a beautiful red solution. The dose is three to six grains. He concludes that it is a remedy to be recommended against lumbricoids and tæniæ, and that it is much more poisonous to the parasites, and less so to the host, than other substances used for this purpose. The administration, on account of the caustic taste of the ammonia, is best in powder form in a wafer. If it is used in large doses as a vermicide, a purgative twenty-four hours later will be sufficient; if only as a vermifuge the purgative should be administered at the same time or shortly after the remedy.—*Lo Sperimentale*, 1892, fasc. 2, p. 141.

Drug Habituation.

Dr. Lucius W. Baker believes that to the increased predominance of the nervous temperament, to the insatiate demand of an enfeebled nervous system for some excitant which shall enable it to triumph over its weakness, one finds the cause of the increased consumption of stimulants, narcotics, and hypnotics of recent years. Since this is the underlying condition we can understand that the three most important factors in the formation of drug habits are pain, exhaustion, and insomnia, and these may often be met with aside from any organic disease, but are frequently the outcome of an impaired or unstable nervous system, and of improper methods of living. He concludes: 1. That the facility with which nervous processes repeat themselves constitutes the organic basis of habit, the nerve-cells becoming fixed in the direction in which they are constantly exercised. 2. The continued use of drugs—notably alcohol, chloral, and opium, may establish an abnormal condition of the nervous centres, which in itself is a constantly recurring plea for their habitual use. 3. Drugs for the relief of these conditions should be prescribed with care and with due regard to the danger of subsequent habitual use. 4. The treatment of drug habituation is unsatisfactory unless all the surroundings of the patient during treatment can be absolutely controlled by the physician in charge. Relapses are quite common.—*The Alienist and Neurologist*, 1892, No. 2, p. 276.

A Case of Hyoscine Poisoning treated by Pilocarpine.

Mr. Herbert L. Evans treated unsuccessfully a patient suffering from delirium tremens by chloral, bromides, and morphine. Three minims of a 1 per cent. solution of hyoscine resulted in coma, dilated pupils and arteries, rapid pulse, congested face, hot, dry skin, and rapid and deep breathing. Morphine was injected without improvement. Hypodermatic injections of pilocarpine, amount not known, but probably in all about two grains of the nitrate, at five-minute intervals, were followed by rapid improvement, and seemingly without craving for liquor.—*Lancet*, 1892, No. 3580, p. 797.

The Treatment of Pleurisy.

Prof. Dujardin-Beaumetz, in taking part in the discussion upon this subject at the Académie de Médecine, Paris, is entirely opposed to the idea

that a vigorous antiphlogistic treatment will jugulate a pleurisy, or even that it is of advantage—believing that, in spite of the fact that venesection has gone out of fashion, it is at the present day by no means indicated, and, moreover, it is likely to do harm, because, in a very large proportion, cases of the disease are of tubercular origin. The facts presented by Prof. Peter at a previous meeting, upon analysis, do not by any means show that the results of the present time are more unfavorable than in the time of Andral and Bouillard. In fact, he believes that we now treat this disease much better than formerly, because we practice, on suitable occasions, thoracentesis. Further, in empyæma bacteriological examinations of the pus give excellent indications for treatment and prognosis. M. Dieulafoy believes that thoracic aspiration, properly performed, cannot result in harm to the patient by giving an opportunity for the production of an empyæma; it not only aids the cure of the patient but frequently saves his life. He bases his choice of the time for operation not upon the duration of the disease, nor upon the presence or absence of fever, nor upon the presence of dyspnœa, but upon the quantity of effused fluid, of which he does not remove more than a quart, by aspiration, at one sitting. In determining the death-rate, the fatal result when the patient succumbs to tuberculosis or cancer after a pleurisy due to these diseases as a starting-point, should be ascribed to the tuberculosis or cancer, and not be charged to the pleurisy. M. Harry makes a vigorous attack upon the doctrine that it is the disease that is to be treated, and insists that the condition of the patient is to be taken into consideration, not hesitating, indeed, in suitable cases, to employ leeches, or even venesection. He believes that the relationship of tuberculosis to pleurisy may be accidental, or that the latter may be a predisposition to the former from its interference with the nutrition of the lung. M. Sée believes that it is a self-limited disease, like pneumonia, erysipelas, or the eruptive fevers. He chooses the time for aspiration when, taking the natural course of the disease as a criterion, the expected diminution of the fluid does not occur, namely, about the twentieth day. He regards dyspnœa or cyanosis as valid grounds for aspiration at any stage of the disease.—*Bulletin de l'Académie de Médecine*, 1892, No. 18, p. 645; No. 19, p. 673.

The Seventh Case of Traumatic Tetanus Cured by the Antitoxin of Tizzoni-Cattani.

Dr. G. Casali reports the case of a healthy woman of twenty-two years who received an injury upon the right foot. Exploration of the wound on the following day discovered some pus and decomposed manure in it. Eight days after the accident the symptoms of tetanus appeared, which were treated by chloral for six days. On the fourteenth day the treatment by hypodermatic injection of antitoxin was begun and continued for six days, when the patient was entirely relieved. A cultivation made from the material in the wound before it was cauterized, developed the bacillus of tetanus, the streptococcus of sepsis, and bacillus found in soil. The conclusions are that the action of antitoxin is curative for tetanus, in a short space of time and in relatively small doses.—*La Riforma Medica*, 1882, No. 124, p. 579.

[This and the other reported cases are very satisfactory and give substan-

tial reasons for believing that at last this disease is amenable to treatment. Hitherto single cases have been reported in medical literature in which a treatment consisting of a combination of chloral and Calabar bean has apparently yielded better results than any other purely medicinal remedies. (*See* (AMERICAN JOURNAL OF THE MEDICAL SCIENCES, 1892, No. 238, p. 192.) A case showing indisputably the very great value of the combination of these remedies was treated as early as 1870 by Dr. Thomas G. Duncan (*personal communication*). In the absence of antitoxin we would strongly recommend a consideration of these drugs.—R. W. W.]

PNEUMONIA AND THE ABSCESS OF FIXATION.

DR. RAOUL having read the report of the case of pneumonia treated by the method of Fochier, which was reported by Lepine, and also the communication of Dieulafoy on the same subject, records his case in this connection. A case of pneumonia on the sixth day, apparently in a desperate condition, received two injections of fifteen drops of essence of turpentine, one in the region of the right deltoid, the other in the middle of the right thigh. Within twelve hours the respiration fell from eighty to forty-eight per minute; two days after, defervescence took place. Five and eight days later the abscesses were opened and the recovery was uneventful. The reporter is very strongly of the opinion that the formation of the abscesses was the principal factor in the great relief which persisted to the final cure of the patient.—*Revue gén. de Clinique et de Thérapeutique*, 1892, No. 19, p. 295.

A PROVISIONALLY CURED CASE OF RELAPSED MAMMARY CANCER.

PROF. ADAMKIEWICZ reports as follows: A woman of forty-three years on September 17, 1891, underwent the operation of removal of a cancer of the left breast, cleaning out of the axilla and excision of all the perceptible glands of the infra-clavicular fossa. Small masses were, however, left in the neck; these had enlarged before her discharge on October 5th. On January 15, 1892, she came under the reporter's care. On the same day the treatment by injection was commenced; the consistence of the glands so rapidly diminished that on February 5th, when the patient was presented before the K.-k. Gesellschaft der Aerzte, they had disappeared, only a slightly perceptible thickening remaining where the tumors had been situated. After two months, during which no injections had been made, the condition had not changed, so that it may be concluded that the trifling remains of the former tumors may not longer be of a carcinomatous nature. If this supposition is correct, then this patient must be regarded as only provisionally cured.—*Wiener medizinische Presse*, 1892, No. 16, S. 621.

[It is believed that, as yet, the material and method of treatment employed by the reporter have not been made public. This case does not present complete evidence, since there is no report of the microscopical examination of the primary tumors, nor, indeed, positive statements in regard to the tumors treated, so that had the first tumor been proven to be malignant the identity of the last with it could be determined.—R. W. W.]

MEDICINE.

UNDER THE CHARGE OF

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A CASE OF INTUSSUSCEPTION ASSOCIATED WITH CANCER OF THE CÆCUM.

The following case illustrates the fact that chronic intussusception may be associated with epitheliomatous disease of the bowel; and it is highly probable that the malignant growth antedated the invagination and was the provoking cause.

A man, aged 40, was admitted to Middlesex Hospital, under the care of DR. COUPLAND, complaining of a swelling in the abdomen, which had appeared after severe colicky pains lasting ten days, and attended at first by vomiting. On admission he was free from jaundice, the tongue moist and furred. On palpation there was a rounded, cylindrical swelling, dull on percussion, passing toward the right from the umbilicus, over the lower edge of the liver in the course of the colon. Under rest and low diet the tumor shifted wholly to the left of the umbilicus. Under the impression that it was a fecal tumor, enemata and mild purgatives were given for five days, with satisfactory results. At the end of this time the tumor had entirely disappeared, and the patient was discharged four days later.

About two months later he was readmitted. Acute vomiting and diarrhœa had followed the taking of some jalap four days previously; some blood was passed with the motion, and the stools had now become blackish and offensive. The abdomen was tense and tympanitic, and the face anxious. A firm, rounded, cylindrical swelling was made out crossing the abdomen from the right flank to the left hypochondrium. The pulse was fair; there were no signs of collapse, and there was no tenesmus. The nature of the case was now obvious, and from the duration of symptoms surgical interference was out of the question. Opium was given freely, and the colon gently irrigated with warm water. The next day the general condition was markedly worse; incessant vomiting, fecal at the last, and rapid failure of the pulse, ended fatally in a few hours.

The intestines were much distended and lines of red injection were observed along the contiguous coils. There was no lymph; no fecal extravasation. The hepatic flexure of the colon and the first part of the transverse colon formed a large cylindrical tumor due to the invagination into the gut of the cæcum and part of the ileum, the length of the whole mass being ten inches and a half. On laying open the colon the mucous membrane of the

intussuscepted bowel was seen to be intensely reddened and swollen and it had commenced to slough near its free extremity. Here also could be seen two orifices—namely, one leading into the appendix cæci, the other into the ileum. Moreover, at the upper part of the head of the intussusception the lining membrane was replaced over an area of the size of a crown piece by a soft, whitish, fungating and ulcerating mass of new-growth. No adhesions could be made out between the serous layers of the intussusception. The rest of the intestines and the stomach showed nothing abnormal. No new-growth was found in any other part of the body.

"The case speaks for itself. It illustrates the possibility of mistaking intussusception in the adult, especially of the ileo-cæcal variety, for fecal tumor. The error has been made before, when, with a history of constipation and no urgent symptoms of obstruction, a tumor forms in the region of the colon. Fortunately, large enemata, which generally satisfactorily dispel fecal tumors, may have the same effect on the slighter forms of intussusception, with which alone the diagnostic difficulty lies; but it is remarkable that, whereas in this case enemata failed to produce that result, it took place after the administration of castor oil, a treatment which would certainly not have been adopted had the diagnosis been correctly made."—*Lancet*, 1892, No. 3592.

Actinomycosis of the Foot, commonly known as Madura Foot.

Mr. N. I. Hewlett, of London, gives the following description of the appearances of a specimen of "Madura foot" submitted to him for examination (*Lancet*, 1892, No. 3592):

"The disease occupies the whole of the foot and the lower third of the leg. The foot is enlarged, the bones softened and carious, and small abscess cavities are scattered through the tissues and communicate with the surface by several sinuses, the external openings of which have raised and thickened margins. There are other small cavities containing many fine yellowish particles, the so-called roe-like granules, and hence the specimen belongs to what has been described as the pale variety of Madura disease. The raised margin of a sinus was removed, and sections prepared from it. In the unstained condition the appearances are characteristic. Scattered through the sections are yellowish bodies varying somewhat in size, and frequently of a more or less reniform shape, and occurring in groups of three or four or more. These bodies are somewhat granular, have distinct margins, and are surrounded by an indistinct, radiating structure, beyond which again are round cells, the whole being enclosed in a distinct fibrous capsule. The appearances in stained specimens are conclusive as to the nature of the fungus. By the method of Gram the so-called 'fairy-rings' of the fungus are occupied by a central network of fine, branching, interlacing filaments stained blue, but the club-shaped bodies are unstained. By staining with orange-rubin, however, typical clubs can be demonstrated at the periphery."

The close resemblance of mycetoma (Madura foot) and actinomycosis hominis was first pointed out by Vandyke Carter, in 1886, and subsequently by Bristowe and Acland. Kanthack upholds their identity. No doubt the presence of a network of filaments and the apparent absence of the club-

shaped bodies have been the causes of hesitation in fully recognizing the identity of the two diseases.

By using appropriate methods of staining, the microscopical appearances of the two diseases are shown to be identical. Professor Crookshank concurs in the author's opinion.

Electrical Resistance of the Urine as an Aid to Diagnosis.

Dr. Dawson Turner, of Edinburgh, points out (*Lancet*, 1892, No. 3594) that the specific resistance of normal urine is on the average about 45 ohms, and that it varies, as a rule, more or less inversely with the specific gravity.

From experiments he finds that the resistance depends almost entirely on the contained salts, and that it is only when these are quite absent or very much diminished that the influence of the urea makes itself felt. Croupous pneumonia and diabetes mellitus are exceptions to the above-stated rule.

Absence of Orthopnœa in Fatal Cardiac Dilatation, especially when Affecting the Right Side.

Dr. Handford, of Nottingham, reports four fatal cases which exhibited this condition. The views of Hilton Fagge and W. Russell are considered, but in the author's opinion a satisfactory explanation is still wanting. "It would appear that the upright position gives relief chiefly in failing compensation in valvular disease and in the failing heart of renal disease; but that in dilatation, especially when the right side is affected, and in degeneration of the cardiac muscle, as in anæmia after fevers, diphtheria, septic poisoning, etc., the tendency to faintness, produced by the upright position more than counterbalances any advantages."—*Lancet*, 1892, No. 3591.

Thrombus of the Inferior Vena Cava following an Attack of Enteric Fever.

At a meeting of the Glasgow Pathological and Clinical Society, Mackintosh (*Glasgow Medical Journal*, July, 1892, page 54) reported the case of a man, nineteen years old, in which, in the tenth week of the disease, the feet began to swell. Six weeks after the man got out of bed he contracted scarlet fever. The legs remained swollen. Soon after this the subcutaneous veins of the trunk and legs became prominent. The swelling of the legs gradually disappeared, but the condition of the veins persisted, though in less degree than at first. The internal mammary, the superficial epigastric, the external pudic, the internal saphenous and the superficial circumflex iliac veins on both sides remained enlarged and tortuous, collateral circulation being established. It was thought that the condition was dependent upon the formation of a thrombus at the junction of the iliac veins and the inferior vena cava.

Scurvy.

Berthenson (*Deutsches Arch. f. klin. Medicin.*, xlix., H. 2–4) reports the results of a study of 225 cases of scurvy seen in the course of an epidemic at St. Petersburg in the spring and summer of 1889. Seventy-six of the number

developed while under observation in hospital. The disease attacked patients in hospital in greatest number at such times as the greatest number of cases were admitted from without; not rarely, well-nourished individuals suffered, while the badly-nourished escaped. In 21 cases, scurvy developed in the course of typhoid fever. The association did not appear to depend upon the intensity of the typhoid infection. In most cases the complication appeared during convalescence.

In three cases, the symptoms of scurvy and those of typhoid fever developed simultaneously. The gravity of cases of typhoid fever was greatly increased by the coexistence of scurvy.

In only one case did typhoid fever develop as a sequel of scurvy. In the cases of tuberculosis complicated by scurvy, the development of the latter was independent of the state of the nutrition; the course of the pulmonary process was, as a rule, accelerated; the temperature was elevated, and often inverse in type; pleural and peritoneal effusions were unusually common; the sputum became putrid, and in one case pulmonary gangrene took place; hæmoptysis was not frequent; the mortality was increased. Nine cases of scurvy were complicated by pleurisy; in all, the temperature was afebrile. There were 11 cases of acute gastro-intestinal catarrh, in the course of which scurvy developed in hospital. In 20 cases, of which 11 developed in hospital, chronic intestinal catarrh was complicated with scurvy. In 38 cases, hemorrhages took place into various cavities, most commonly and exclusively into the pleuræ. Hemorrhages also took place into the retina, into bone, into the serous covering of the liver, into abscesses, and into the inflamed cornea. In 48 cases cutaneous and intermuscular extravasations of blood were observed in connection with scorbutic anemia. Scorbutic cachexia developed in 70 cases, in 17 without local symptoms; in 17, changes in the gums were observed in the absence of cachexia; in 21 cases, changes were observed in the skin, with scarcely discernible anæmia. In many cases, the general nutrition was satisfactory; in some cases it was even good. In a small proportion of cases the appetite was impaired. Nausea, epigastric pain, coated tongue, pyrosis, vomiting, meteorism, and abdominal pain were uncommon. In the majority of cases the bowels were regular; in a few they were constipated; in a larger number there was diarrhœa. Icterus was exceptional. The liver was enlarged in 7 cases, the spleen in 42. Pains in the lower extremities were present in the majority of cases, usually in the calves. In 27 cases there was headache; in others tinnitus, vertigo, delirium, a typhoid condition, hyperæsthesia, catalepsy, palpitation, insomnia, and syncope. In 85 cases the gums were soft and spongy; 17 of these presented likewise hæmophilia. Uncomplicated cases were attended with febrile reaction of intermittent type. The febrile period lasted on an average from six to eight days. The cases were divided, according to intensity, into—mild 125, moderate 48, severe 52. The disease lasted for from two weeks to seven months. In the majority of cases the course of the disease was mild. Involvement of the gums was wanting in more than half the cases. In three cases death resulted directly from the scurvy. Of the remaining 16 fatal cases, 6 were complicated by typhoid fever, 9 by tuberculosis, and 1 by pneumonia. In treatment no remedy was used as a specific. Carbolic acid was used when intestinal catarrh existed; sodium salicylate, in cases of pleural or pericardial effusions; citric

acid, sulphuric acid, and phosphoric acid were also used. The diet was not exclusive, but varied. The conclusion is arrived at that scurvy is an infectious disease; it is not denied, however, that the nutrition may indirectly exert a predisposing influence.

Precocious Syphilitic Tabes.

Pauly, *Lyon Méd.*, 1892, No. 24, reports a case of syphilitic tabes developing four months after the initial lesion, in a man aged thirty-eight years, without neurotic heredity. It made its debut with laryngeal crisis. Fulgurant pains appeared, at first only at night. The tabetic symptoms were of rapid progress, and the general condition of the patient became quite feeble. Serious secondary lesions (iritis, mucous patches) preceded the onset of the ataxia and continued during its development.

At the time of the report, the severity of the attacks had lessened under the influence of large doses of potassium iodide and mercurial inunctions. The author, however, still looked upon the prognosis as grave.

A Bacillus in the Blood of Typhus-fever Patients.

T. M. Cheesman (*N. Y. Medical Record*, 1892, No. 26, p. 716) has discovered a new bacillus in the blood of six patients suffering with typhus fever. This bacillus is pathogenetic for rabbits, guinea-pigs, and white mice, but the effect produced upon them does not resemble the symptomatology of typhus fever.

"The diameter of the bacillus varies from 0.5 μ to 0.8 μ, and the length from 1.0 μ to 2.5 μ. It occurs singly and in pairs, infrequently in short chains of six or eight. It is often club-shaped, and is found to be ovoidal in young cultures. It stains readily with the ordinary aniline dyes, and retains the color after staining by Gram's method. After some days' growth certain of the bacilli stain irregularly, presenting a sort of mottled appearance. The bacilli are immobile, and spores were not found, although some of the club-shaped bacilli show circular, unstained spots which do not color by the methods usually employed for spore-staining."

Identity of the Bacillus Coli Communis (Escherich) and Bacillus Typhi Abdominalis (Eberth).

Rodet and Roux (*Arch. de Méd. Expér.*, 1892, No. 3) publish a further contribution toward the identification of the typhoid-fever bacillus of Eberth and the bacillus coli communis.

As a result of numerous experiments, they contend that the same lesions may be produced in animals inoculated with either of these microbes; that the same variations in temperature occur, and that the evolution of the experimental disease is the same in both instances; that the results of inoculation vary under different circumstances, but that the variation is the same for the two organisms. They maintain, therefore, that the bacillus of Eberth is but a modified form of the bacillus coli communis, the modification being brought about by the pathologic processes induced in the intestine by typhoid fever.

Conditions Affecting the Virulence of the Bacillus Coli Communis.

Lesage and Macaigne (*Arch. de Méd. Expér.*, 1892, No. 3) have investigated the pathogenetic powers of the bacillus coli communis. The organism, when derived from a normal intestine, is devoid of pathogenetic power, unless the culture be used in what they term an "excessive dose" (more than one cubic centimetre). Pathologic processes in the intestine give to the microbe an acquired virulence. Diarrhœa produced by tartar emetic had the same effect as diarrhœa from other causes; the organisms were rendered pathogenetic. Under pathologic conditions, the bacillus coli communis likewise acquires the power of penetrating the intestinal wall, and at necropsies is found disseminated to a greater or less extent throughout the cadaver. This dissemination was demonstrated in cases of diarrhœa, cholera infantum, cholera morbus, and typhoid fever. In cases of pneumonia and bronchopneumonia due to influenza, bacteria coli were found in the lungs, but the infection was not generalized. The authors consider that this invasion of the body occurs during the death agony, and is not entirely post-mortem.

Having acquired virulence, the bacillus coli communis exhibits pathogenetic powers in varying degree, and may give rise to suppuration or septicæmia, to peritoneal or visceral inflammations, which may be serious or slight.

Post-paroxysmal Albuminuria of Epileptics.

Voison and Péron have made a number of observations upon post-paroxysmal albuminuria of epileptics. They state that post-paroxysmal albuminuria is found in about one-half of the cases of epilepsy, and that it is found in all varieties of the affection. The presence of albumin in certain cases may give rise to diagnostic error, the disease being confounded with eclampsia. The albuminuria of epilepsy is constant for the same patients, but it is quite fugacious, and the quantity of albumin variable. It is manifested especially in the two hours first succeeding the convulsive attack, and appears to bear a constant relation with the congestion of the face.—*Arch. de Neurologie*, 1892, vol. xxiii. p. 59.

Relations between Spontaneous Somnambulism and Hysteria.

Mesnet (*Arch. de Neurologie*, 1892, vol. xxiii., No. 69) recalls attention to his previous communications concerning the relations between spontaneous somnambulism and hysteria (*Arch. gén. de Méd.*, February, 1860).

He reports a case which came under his observation in 1872. The patient was a young girl of seventeen years, of delicate constitution, scrofulous and anemic. For some time she had had various hysteric symptoms, such as weakness and partial anæsthesia of the extremities and hyperæsthesia along the vertebral column. For some months she was subject to nervous seizures of a peculiar kind, which gradually assumed periodicity, at first daily, afterwards twice daily, varying much in detail. The essential characters of the attack were abnormal gaiety, followed by a sudden profound slumber, lasting a varying number of hours, from which she would suddenly start up, and while apparently still asleep, indulge in violent language, attempt to leave

the room, and in other ways give evidence of a somnambulistic state. This would be followed by another period of profound slumber, after which the patient would awake in a normal condition, apparently oblivious of all that had preceded. After total failure of various methods of treatment, recovery ensued upon admission to a hospital for mental diseases, through profound mental impression on assurance of recovery.

The author concludes that whatever their form—ecstatic, cataleptic, syncopal, lethargic, somnambulistic or convulsive—the nervous crises are to be considered but as the varying expressions of a morbid process identical in nature and origin, arising from a common source—hysteria.

The Microbe of Influenza.

Pfeiffer and Beck (*Deutsche med. Wochenschr.*, 1892, No. 21) have made further investigations into the etiology of influenza. During the course of the disease, the bacilli are best found in the morning's sputum. Care must be taken to get the bronchial secretions. The dry cover-glass preparation is quickly heated and stained for ten minutes in a 5 or 10 per cent. dilution of Ziehl's solution. Tissue sections are immersed for from ten to thirty minutes in dilute carbol-fuchsin solution, decolorized with care in absolute alcohol slightly acidulated with acetic acid, then cleared and mounted with xylol balsam.

The influenza bacilli, which are sometimes found free in the viscid mucus, sometimes enclosed in the protoplasm of the pus-cells, resemble somewhat the bacilli of mouse septicæmia, which are likewise frequently found within the leucocytes.

The organisms of influenza, however, are shorter and more slender than the others. Only an inexperienced observer could confound them with Fränkel's diplo-bacilli. They lack the so-called capsule, and cannot be stained by Gram's double stain. The number of bacilli found in sputum varies greatly.

Quite characteristic is the pathologic anatomy of the lungs in fatal cases of typical influenza pneumonia. Massive hepatization is not found, but there are many small foci of broncho-pneumonitic consolidation, usually sharply discriminated, at times confluent, and situated principally in the posterior portions.

Section through such foci of broncho-pneumonia reveals the openings of bronchial tubes, out of which can be pressed a yellowish-green purulent secretion, resembling the particles found in sputum and recognized as bronchial secretion. Microscopically these are made up of pus-cells imbedded in viscid mucus, containing free, or within the cells, typical influenza bacilli, often in great number and usually in pure culture.

It would seem from this that at least a part of the sputum of influenza comes from the finer divisions of the bronchial tree. Microscopic examination of the lung parenchyma shows that this also participates in the production of the purulent secretion of influenza.

Upon microscopic examination of the infiltrated portions of the lung, one is at once struck by the fact that the bronchi are almost completely occluded with round cells. The epithelial investment is for the most part intact, but

here and there leucocytes have pushed the ciliated epithelium to one side, or penetrated beneath it.

In the pus-cells filling the lumen of the bronchi are found innumerable influenza bacilli, lying free. These microbes are also found lying free upon and between the epithelial cells. Sometimes the slender rods can be traced beneath the epithelium. In the lung-tissue itself, there are often found in the neighborhood of the bronchi (sometimes, however, altogether independent of macroscopic relation therewith) pneumonitic foci.

In the centre of these there is invariably to be seen the entire tissue, alveoli and septa, infiltrated with typical pus-cells, so that the pulmonary tissue is apparently destroyed. The surrounding lung structure presents the picture of desquamative inflammation. The large cells, which here fill the lumen of the alveoli, are less and less mixed with leucocytes, the further from the centre the point of examination. Fibrin can be demonstrated by Weigert's staining method. The pus-cells are filled with bacilli, which can be recognized as typical influenza organisms. Fränkel's diplococci were not encountered by the authors in any of these typical influenza pneumonias. They have not been able to confirm the observations of Canon concerning the presence of the bacillus in the blood of influenza patients, or those of Chantemesse concerning the pathogenetic influence of such blood upon guinea-pigs. It appears to them to be proved that the influenza process develops locally in the bronchial tree, and that a generalization of the affection by the blood can be excluded from the usual sequence of phenomena. They do not consider it proper to deny that bacilli may enter the blood, but they are inclined to doubt the influence of such entrance upon the pathogenetic evolution of influenza.

The influenza bacilli grow exclusively at body heat, and are aërobic bacteria. They have been found sensitive to desiccation. A temperature of 60° destroys the bacilli in bouillon in the course of five minutes. The addition of chloroform acts as a disinfectant within a few minutes under like conditions. It has thus far not been possible to demonstrate the existence of a permanent form of the bacillus. In none of the cases of influenza were the bacteria described not found, nor were they found in cases in which influenza could be excluded. At necropsy they were found in such numbers and in such arrangement, that their etiologic relation seemed indubitable. Of more than one hundred rabbits inoculated with the sputum of influenza patients, not one presented the sputum septicæmia of Fränkel. Only in the case of monkeys was it possible to artificially establish a disease at all comparable with influenza.

Association of Tabes and Hysteria.

MM. Paul Blocq and J. Onanoff (*Archives de Méd. Expér.*, 1892, No. 3) report a case occurring in the service of Charcot, in which the tabetic syndrome at first simulated hysteria.

The patient was a hostler, aged thirty-five years, without neurotic, gouty, diabetic, or rheumatic heredity. His father and one brother died of nasal hemorrhage; one brother died of hemorrhage following amputation; a third brother of pulmonary tuberculosis. The patient had had scarlatina at the age of twelve years. There was no syphilitic history. For ten or twelve

years he had been slightly intemperate in the use of wine. In October, 1888, he was kicked on the right side of the head by a horse, and remained unconsicous for an hour and a half after the accident. There was no other disturbance following the injury except nightmare of a professional character. No mental trouble followed, nor did there appear to be any physical sequel until about a month later, when the patient noticed that his eyes deviated outward, and that his forehead, where the wound had cicatrized, had an icy feeling. His sight gradually failed, and he had frequent attacks of cephalalgia, conjoined with extreme weakness, which obliged him to enter the hospital. After two months he was discharged much improved. Some six months later, without appreciable cause, he began to experience pain in the right shoulder. After this had persisted for three or four days, he awoke one morning with incomplete monoplegia of the right superior extremity. Examination on his reëntering the hospital showed paresis of that extremity with anæsthesia in the neighborhood of the shoulder, sharply circumscribed by a circular line. About a year later he again came under observation, presenting the following symptoms: Paresis of the right arm and hand; abolition of tactile sensibility over the upper portion of the face as far as the labial commissures; abolition of tactile sensibility over the whole extent of the right upper extremity and that part of the thorax corresponding with the insertion of the right pectoralis major; posteriorly, tactile anæsthesia over the portion corresponding to the superior half of the right trapezius; analgesia of the upper portion of the face and over the upper portion of the trapezius; conjunctival and corneal sensibility lost; muscular sense preserved; pharyngeal reflex abolished on the right; taste delayed on the left half of the tongue; smell and hearing unaffected; double external strabismus from paresis of the motor oculi nerves; the pupils slightly and equally contracted and not reacting to light; paresis of accommodation in both eyes; contraction of both visual fields; no impairment of color sense; V = O. R. $\frac{1}{2}$, O. S. $\frac{1}{4}$; no lesion of the fundus.

The patient was weak, cachectic, had night-sweats, and presented the physical signs of advanced pulmonary tuberculosis. Having declared that ordinarily he did not sleep until the night was far advanced, he was given, at 8 P.M., four grammes of chloral; at 9.30 he was found in a profound normal slumber without significant facial expression. The right eyebrow was slightly lower than the left. The eyelids were completely closed. Each eye was successively opened with little resistance and without waking the patient. The pupils were much dilated and did not react to light. The eyeballs were fixed in permanent external strabismus to the same degree as during waking hours. On awakening the patient the pupils immediately contracted to their usual size; the strabismus was not affected. The nervous symptoms were not modified in the further progress of the case, and after a few months death occurred from tuberculosis.

Necropsy, thirty hours after death. The eyes were fixed in external strabismus. On the convexity of the right cerebral hemisphere three small yellow areas of softening had given rise to three shallow cavities, situated at the anterior part of the frontal lobe and of the temporal lobe. The medullary pia mater was very much pigmented. Macroscopically, there was no notable anomaly discovered in the medulla or spinal cord: The muscles and nerves

of the eye were dissected with care. The external recti were slightly more yellowish than the other muscles of the eye. The lungs exhibited the common lesions of tuberculosis.

Microscopic examination of the cord showed in the lumbar region a quite limited area of oval shape in the centre of the column of Goll, which appeared to differ from the rest of the posterior fibres by more pronounced staining and greater abundance of nuclei. In the dorsal region characteristic lesions of posterior sclerosis were demonstrated in the neighborhood of the eighth dorsal pair, not very pronounced and greater upon the right side than upon the left. In the cervical region posterior sclerosis was marked, predominating upon the right side. In the superior cervical region the lesions reached their maximum of development, but were still confined to Burdach's columns, the asymmetry of the two sides being still more readily appreciated. In the medulla sclerotic zones were again seen symmetrically occupying the cuneiform tracts (Burdach's columns), but of greater extent upon the left than upon the right side. The sensory pyramidal tracts were not affected. The bulbar, median, and superior roots of the trigeminus, as well as the extrabulbar sensory roots, were all more or less degenerated. The motor roots were intact. The nuclei of the motor oculi were completely atrophied. The optic nerves and the sixth pair were intact.

SURGERY.

UNDER THE CHARGE OF

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RESECTION OF THE LIVER.

KEEN (*Boston Medical and Surgical Journal*, 1892, No. 17) details the case of a patient from whom he removed a tumor of the liver. A table containing all the reported cases of resection or amputation of the liver is added. His case is that of a woman, aged thirty-one years. Two years before coming under observation, she noticed a lump on the right side of the abdomen; it remained for several weeks, when it was lost sight of. A year later it reappeared, being at that time about the size of a walnut, but steadily increasing in size. The patient was broken down in health and felt wretchedly. Pain and discomfort led her to seek medical advice.

On examination, an oval tumor about the size of the fist was seen on the right side of the abdomen, in the situation of the kidney, separated from the liver dulness by an area of distinct resonance, of three fingers' breadth. The

tumor was movable, moderately tender, and of about the consistency of the kidney. Jaundice has never been present, nor have digestive troubles ever been complained of. The patient has had retention of urine at times, and the quantity passed has lately become small. Examination of the urine showed blood-clots, blood-corpuscles, a few renal cells, uric acid, etc.

The case was thought to be probably a floating and diseased kidney, and exploratory operation was decided upon. An incision was made in the right linea semilunaris, four and one-half inches in length. A multiple cystic tumor of a light bluish-white color was found, which was connected with the extreme right border of the liver. This was removed by the Paquelin cautery and by enucleation with the thumb-nail. The wound was approximated by five sutures passed deeply through the liver substance. The abdominal cavity was flushed with hot water, and a glass drainage-tube inserted. The patient went home entirely well in forty-two days, and when last heard from, seventeen months later, had had no return of her former symptoms.

The tumor measured 4½ inches in its longest diameter, 3½ inches in width, and 1½ inches in thickness. It was found to be a cystic adenoma, originating probably in the bile-ducts.

Of the twenty reported cases, but two are from this country. In nineteen of the cases the sex was mentioned; sixteen of these were women and three were men. The extremes in age were twenty-one and fifty-eight years. Nearly all of the cases were incorrectly diagnosed. The results in the twenty collected cases are: recovered, seventeen; died, two; not stated, one.

Retention-cyst of the Gall-bladder.

Mixter details (*Boston Medical and Surgical Journal*, 1892, No. 17) the case of a woman, aged thirty years, who consulted him on account of a tumor in the right side of the abdomen, with pain and tenderness, almost preventing her from doing her usual work. The mass was freely movable, and was thought to be a tumor or cyst of a floating kidney. An operation was performed, when the tumor was found to be a cyst, lying under the liver. Careful search failed to reveal the presence of a normal gall-bladder. The cyst was stitched to the abdominal opening, and a pint of clear fluid drawn off. Part of the cyst wall was excised and a glass drainage-tube inserted. Careful search with the finger and the probe failed to detect any gall-stones. The cyst was examined, and was thought to be the gall-bladder, greatly distended by reason of some obstruction of the cystic duct. There was never any jaundice. The case is of interest in showing how slight the symptoms may be in occlusion of the cystic duct, and also that the gall-bladder is not essential to comparative health.

Two Cases of Cholecystotomy.

Cabot reports (*Boston Medical and Surgical Journal*, 1892, No. 17), two cases of operations on the gall-bladder. Both were females; the first was about thirty-eight years of age. For six or seven years she had complained of severe spells of epigastric pain. Neither jaundice nor clay-colored stools had existed in her case. The enlarged gall-bladder was readily detected by

palpation. By means of an incision parallel with the lower edge of the ribs, the gall-bladder was exposed and incised. Considerable glairy mucous and four stones were evacuated. The gall-bladder was stitched to the abdominal wound.

The second case was that of a delicate woman, twenty-nine years of age, who had been subject to abdominal distress for some years. Severe pain, with nausea, vomiting, and fetid breath, had been a late symptom. The urine was bile-stained, and fever had been present. The gall-bladder was exposed by an incision similar to that in the previous case. It was found to be enlarged, thickened, and adherent to the parietes. No calculi were found, but glairy muco-pus was evacuated. Palpation of the duct was unsatisfactory, on account of thickening the result of old inflammation. The gall-bladder was stitched to the peritoneum and drained. During an attack of vomiting, later, the patient threw up three or four calculi, and, some days later, several were passed by the bowel. Six weeks after operation, a small biliary calculus appeared in the fistula; these continued to appear for several weeks, above thirty being discharged. It was thought probable that the gall-bladder had opened posteriorly and downward, forming an abscess, into which the stones escaped, and were later expelled as the contraction following healing took place. Both cases made a satisfactory recovery.

Extra-peritoneal Nephrectomy for Renal Tuberculosis.

Rivière (*Lyon Médicale*, 1892, No. 9) reports the case of a woman, aged twenty-five years, who entered the hospital under Prof. Poncet with a very painful lumbar tumor on the right side. Her father died from an acute affection, probably pneumonia. Otherwise there was no especial interest in the family history.

Three months after the birth of her second child she began to complain of pain during micturition, which became abnormally frequent. The urine was always clear. The case remained without pronounced aggravation for some time, when she had four or five hours' great pain, which was thought to be nephritic colic, but it was not accompanied by radiation of the pain along the course of the ureter. The urine was then examined, and was found to contain a purulent deposit with a pulverulent magma, in which were found calculi, but never larger than the head of a pin. These paroxysms of pain persisted during a period of two months, but their intensity and duration diminished. Injections of morphine and a milk diet were ordered. Some months later, these crises of pain were replaced by constant suffering—a deep burning sensation—at the same point. At this time a tumor appeared in the right lumbar region, painful on palpation. Polyuria developed, and her general condition showed evidence of her trouble. The axillary temperature rose rapidly to 40° C. (104° F.), and was not influenced by antipyrin and quinine. There were anorexia, constipation, and emaciation. Blood appeared in the urine, which amounted in twenty-four hours to 1200 grammes. The tumor in the lumbar region did not give a sense of fluctuation. The bladder seemed voluminous, indurated, and painful. By the vaginal touch an elongated, painful tumor was felt on the right side of the cul-de-sac, seeming to be on

the line of the ureter. The diagnosis of calculous pyelo-nephritis, based on the clinical history and complete absence of signs of pulmonary tuberculosis, was made. Nephrotomy was decided upon, reserving the possibility of a more radical intervention. A vertical incision was made, starting from the last false rib. The peritoneum was easily separated, and the kidney reached. It seemed strewn all over with tubercles and granulations. The mass was isolated, the pedicle ligated, and the organ removed without difficulty or hemorrhage. Superficial and deep sutures were employed. The kidney was increased in size, and presented in its lower portion a soft tumor, which, when incised, discharged blood and grumous matter. The surface presented lenticular tubercles. On section, the organ was found to be cystic and filled with cheesy matter, but no calculi were discovered—the cavernous tuberculous kidney of LeDentu.

The author recommends in nephrectomy the lateral extra-peritoneal method of Trélat. The incision, however, must not be made too near the spine, as, from the thickness of the muscular mass, one works at the depth of a veritable tunnel. The transperitoneal method is objectionable, as it injures the peritoneum and the kidney and its pelvis are less visible.

Fifty Cases of Left Inguinal Colotomy, with Remarks on their Points of Special Interest.

Allingham records (*British Medical Journal*, May, 1892) fifty cases of left inguinal colotomy. He considers that for every reason this operation is superior to lumbar colotomy, except in a few selected cases. The author's method of performing this operation is as follows: An incision not more than two inches in length is made about one and one-half inches inside the left anterior superior spine of the ilium. The abdominal cavity is opened, and a sponge introduced to keep the intestines and omentum from prolapsing while the parietal peritoneum is stitched to the edges of the skin wound. A good loop of the sigmoid is then drawn out, and a stitch put through the skin on one side, then through the mesentery behind the bowel, back again through the mesentery, and tied to the end of the suture which has passed through the skin. When this is tightened the peritoneum of the mesentery is brought in contact with the parietal peritoneum, and adhesion quickly takes place; thus the gut is prevented from slipping back. The gut is then fixed, by sutures passed through the peritoneal and muscular coats, to the margin of the skin wound. On the following day the gut is opened, or, if there be no distention, it may be left three or four days, according to the condition of the patient. In a week's time, if the walls of the divided gut be too prominent, they may be cut off with scissors even with the skin.

The supplementary operation, as the author calls it, is done to prevent prolapse of the gut through the opening. In drawing the loop of the bowel through the incision it should be pulled taut, both from above and below. At the end of a week all the gut outside of the body is clamped close to the skin with the author's spiked clamp, and the portion above cut away. The clamp is removed at the end of twenty-four hours. To prevent the passage of feces beyond the opening a good spur is necessary. If fecal matter passes into the distal portion of the gut, the result of the operation has been a fecal

fistula, instead of an artificial anus, and the pain and irritation of the diseased bowel, due to the presence of feces, is not relieved.

Of the fifty recorded cases, thirty-six were inguinal ordinary operations, and in fourteen the supplementary operation was done. In seventeen cases the mesentery was long (at least five inches); in twenty-five cases it was medium (two to three inches), and in eight it was short. Prolapse took place in seventeen cases; in five of these from the upper end alone, in six from the lower end alone, and in six from both ends. In seven of the cases the loop was twisted when fixed to the inguinal incision, as was shown by the bowels operating from the lower of the two openings. It may be considered that if the patients live two weeks after operation they have recovered from the effects of the surgical interference *per se*. But two cases died within this time. In one of these the fatal result was due to the gut tearing away on account of excessive coughing. Peritonitis rapidly developed, and with a fatal result. The other case was one in which obstruction had lasted for five weeks, and the author thinks the lumbar operation would have been much better here. The bowel could then have been opened extra-peritoneally. As it was, much difficulty was experienced in bringing the distended bowel well into the small inguinal incision, and also in stitching the thinned walls to the skin. In consequence of vomiting, the small intestines were forced through the wound, tearing away the stitches.

[The ease of performance of the inguinal as compared with the lumbar operation is causing the statistics of the former to accumulate with great rapidity. As a rule they are favorable as to life, the vastly improved technique of abdominal work having lessened the force of what used to be the chief argument in favor of lumbar colotomy, viz., that it was extra-peritoneal. But the greater tendency to prolapse in the iliac operation, the closer proximity of the opening to the disease, and the possibility of peritonitis in the event of a stitch tearing, or a little leakage occurring, leads many operators still to prefer the lumbar route.—J. W. W.]

Remote Results of the Radical Cure of Hernia.

Richelot (*La Semaine Méd.*, 1892, No. 19) regards the operation as benign and effective; he has had but two deaths in 138 operations. In forty-four cases, from 1888 to June, 1891, he obtained thirty-four definite radical cures, eight useful results, and two failures, that is with a complete return of the original condition. In the eight cases there has been a partial return of the hernia, but no more than may be readily controlled by a bandage. As regards the operative technique, he emphasizes the fact that he never incises the aponeurosis of the external oblique.

[If these results will stand the test of time they are noteworthy, but the general experience of surgeons everywhere is that at least 40 to 50 per cent. of cases operated upon for the "radical cure" suffer from relapses. —J. W. W.]

Treatment of Spontaneous Luxations of the Femur in Coxalgia.

Calot (*Ibid.*, 1892, No. 22) believes the reduction of this displacement possible, and that the bone may be retained in position. He has replaced

a femur in which the luxation was over a year old. Reduction was performed under chloroform, by means of vigorous traction, following efforts at loosening of the bone. He claims that these manœuvres are not accompanied by the formidable dangers mentioned by Malgaigne.

Diagnosis and Treatment of Intestinal Occlusion.

Comte, in an interesting article on this subject (*Revue Médicale de la Suisse Romande*, 1892, No. 3), refers to a case observed by Nothnagle, and a case reported by Iléus, in which occlusion was caused by a valvular obstruction of the small intestine. Schlange attaches great importance in the diagnosis of the point of occlusion to the dilatation of the intestine and the peristaltic movement of this dilated part. The dilatation and movements can be seen with the naked eye, or detected by palpation.

According to the latter author the portion of intestine above the obstacle cannot distend itself to a marked degree, because vomiting ensues and relieves the distention, but a loop of intestine which is the seat of a volvulus soon becomes meteoritic, which may assume extreme proportions. One can recognize then this loop with the eye, by palpation, and by percussion. Besides, the loop is fixed, and does not present any trace of peristalsis.

v. Wahl arrives at the conclusion that the presence of a markedly dilated coil of intestine, more resistent and immobile, indicates that the cause of the obstruction is situated at the base of this loop, and is either strangulation or volvulus. In two cases referred to the distention was appreciable in the asymmetry of the abdomen, and could also be detected by a sense of increased resistence on palpation.

The mere diagnosis of the anatomical seat is exceeded in importance by the topographical diagnosis, which is the only guide to the operator. Fortunately this topographical diagnosis is possible in a great number of cases: *e. g.*, 1. When there is a tumor which can be felt by palpation, as in carcinoma and invagination of the intestine. 2. When in the chronic forms of occlusion the first portion of the intestine situated above the obstacle is particularly dilated, and the seat of peristaltic movements. 3. When, in the acute forms, one finds in a certain region of the abdomen an intestinal loop, markedly dilated, and with increased resistance, fixed, and without peristaltic movements, it is unnecessary to say that these diagnostic signs are more apparent if the case is seen early. Later, swelling and peritonitis obscure the evidences of ileus.

In a general way the diagnosis of the cause of occlusion has no other value than that of an excellent clinical exercise for the student. In practice it would be absurd to base the treatment on a diagnosis which has an equal chance of being right or wrong.

We must distinguish two well-defined categories of intestinal occlusion. Ileus by strangulation may be recognized by localized meteorism of the strangulated loop, by asymmetry, the loop is fixed, more resistent, and without peristalsis. The general symptoms are marked with signs of collapse, as in strangulated hernia. To this category belong volvulus, the strangulation in a diverticulum, strangulation through an orifice, or strangulated intra-abdominal hernia, and, finally, acute invagination.

The second category of occlusion, known as ileus, by obstruction or obturation, comprises all the cases in which the occluding mechanism consists not in a sudden constriction of one or several intestinal loops, but in an obstacle which acts by compressing a large surface, or by progressive narrowing. Here belong the cases of occlusion by compression of a tumor, the cicatricial narrowing, or carcinomatous involvement, the obliteration by tumors, biliary calculi, fecal impactions, or clot from chronic invagination. These forms all cause a dilatation of the intestine above the obstacle. In chronic cases there follows hypertrophy of the muscular coat of the intestine.

Osteo-arthritic Tuberculosis.

Lannelongue (*La Semaine Méd.*, 1892, No. 19) divides osteo-arthritic tuberculosis into—1. The unexposed and non-suppurating; 2. The unexposed and suppurating, and, 3. The open form. The sclerogenous method of treatment by parenchymatous injections of chloride of zinc is useful in all these classes. In the first stage of the disease, that is before softening and suppuration, a cure should be obtained in a few months at the most. The bone alterations may at times need a complementary operation. In the more advanced cases, that is where the joint is open and suppurating, the same treatment should be instituted, associated with the necessary operative measures, and continued without relaxation until a definite cure is obtained, and this Lannelongue believes will follow in a relatively short time.

Partial Pneumonectomy for Gangrene of the Lung.

Delagenière reports (*Ibid.*, 1892, No. 22) a successful operation in a man of thirty years. In these cases the author urges as complete extirpation of the gangrenous area as possible. It is necessary in every instance to open the pleura freely, and to resect several ribs if free access cannot be secured otherwise.

Appendicitis.

Roux (*Ibid.*, 1892, No. 22) regards the calculi found in cases of inflammation of the appendix as true intestinal concretions, and not fecaloid particles. The attendant peritonitis, which may be serous, sero-purulent, or sero-fibrinous, has but slight significance, and may resolve spontaneously without intervention, in spite of a clinical state of the gravest appearance. In septic peritonitis, which is not easy to recognize in the early stages, the only valuable sign is retraction of the abdominal wall.

Gangrene Consecutive to Sacro-coccygeal Resection.

Leprévost (*Ibid.*, 1892, No. 19) has observed in three instances gangrene following resection of the coccyx and portion of the sacrum, after the method of Kraske. In the suddenness of its appearance, the rapidity of the involvement, and the localization, this lesion closely resembles the trophic troubles of spinal origin, designated by Samuel by the name of acute decubitus, and which every surgeon has observed subsequent to traumatism

of the vertebral column. The sixth pair of sacral nerves which unite with the fifth pair in supplying the skin over the coccyx, are nearly entirely destroyed in resection of the coccyx, and this fact may explain the gangrene observed after resection of this bone only.

[I have seen trophic changes with superficial vesication and sloughing in the course of the small sciatic follow a persistent attempt at removal of carious bone from the anterior surface of the sacrum. There was no other evidence of nerve injury, and healing was rapid and spontaneous.

J. W. W.]

Surgical Operations upon the Biliary Ducts.

Terrier (*Ibid.*, 1892, No. 22) arrives at the following conclusions: 1. Surgical intervention, when medical treatment has been inefectual, is indicated in the chronic cases of cholelithiasis, calculous tumors, hydrops, and empyema of the gall-bladder, and for the temporary or permanent lesions of the cystic and choledic ducts. 2. The operation is relatively harmless when every aseptic and antiseptic precaution is observed. 3. Usually the surgeon should avoid doing a primary cholecystectomy, at least if not absolutely indicated, as in the case of malignant tumor of the gall-bladder. 4. Ordinary cholecystotomy with the establishment of a cysto-cutaneous fistula is a harmless operation, which may advantageously replace primary cholecystectomy in the cases in which this is not indicated. Should the fistula persist beyond a reasonable time, and if the obstruction in the cystic duct is not relieved, secondary cholecystectomy may be performed. 5. The ideal cholecystotomy is preferable to all other operations when the walls of the bladder are not altered, and when the ducts are permeable. Under these conditions the operation is one attended with very little gravity. 6. Cholecystenterostomy is indicated only in cases of irremediable occlusion of the choledic duct and in persistent fistulæ following ordinary cholecystotomy, when neither extirpation of the bladder nor cure of the fistula is possible. 7. It is necessary in every instance to open the bladder, since external exploration is insufficient in most instances to enable one to accurately determine the condition present. Catheterization is a difficult and dangerous operation, rarely followed by beneficial results.

Pathogenesis and Treatment of Surgical Gangrene.

Jaennel (*Ibid.*, 1892, No. 22) recognizes two forms of surgical gangrene—the trophic and the toxic. The former is vascular or nervous in origin, or due to a cellular disorganization consecutive to burns, traumatisms, etc. If of vascular origin, the lesion is pathological (arterio-sclerosis due to syphilis, malaria, alcoholism, or other such cause, embolism of the arteries, non-infectious venous thrombosis, or arterial spasm due to ergot), or traumatic (rupture, compression, or ligation). If the gangrene is of nervous origin, it may be pathological (ulcers, symmetrical gangrene, or sphacelus from decubitus) or traumatic. The toxic gangrenes are due either to a microbic intoxication, either with or without a diathetic state. In the first case, the poison will be general (gangrenous septicæmia, gangrene of the infectious fevers) or local (malignant pustule, septic phlegmon). In the

latter case the same pathogenic causes are modified by the soil upon which they develop—*e. g.*, in a subject of alcoholism or diabetes.

Three methods of treatment are offered to the surgeon: 1. Expectant, in the hope of the spontaneous elimination of the gangrenous segment. 2. Late and economical amputation after a course of expectant treatment, permitting the spontaneous limitation of the gangrene. 3. Early amputation. In cases at all proper, the last method should be chosen.

DISEASES OF THE LARYNX AND CONTIGUOUS STRUCTURES.

UNDER THE CHARGE OF

J. SOLIS-COHEN, M.D.,

OF PHILADELPHIA.

Tuberculosis of the Larynx.

Dr. Ernesto Germonig, of Trieste, reports some favorable results from hypodermatic injections of potassium cantharidate (*Lo Sperimentale*, 1891, No. 9).

Dr. Paul Heymann, of Berlin reports (*Archives Internat. de Laryngologie*, etc., March and April, 1891) a number of satisfactory results from inoculations with potassium cantharidate as recommended by Prof. Liebreich. The doses varied from 0.0001 to 0.0004, and were inserted under the skin between the shoulder-blades. As a rule, they were well borne. No other treatment was employed. The cases were, with one exception, as grave as could be, with extensive alterations in the lungs, and with multiple and deep ulcerations in the larynx. The general condition became improved in a remarkable manner after three or four almost daily injections, but there was no particular influence apparent in the frequence or in the aspect of the bacilli.

Intra-laryngeal injections have been practised with great success by Mr. J. Walker Downie, of Glasgow (*Brit. Med. Journ.*, 1891, No. 1581). He prefers a solution of menthol ten to twenty per cent., and guaiacol two to four per cent., in olive oil or liquid vaseline. The point of the syringe is carried at least as far as the level of the vocal bands and a drachm to a drachm and a half is injected daily. It is said that no inconvenience follows, not even cough. An agreeable sensation of warmth immediately follows which rapidly extends to the region of the sternum, and creates an agreeable glow all over the chest. There is great relief from cough, and a good night's rest is often secured by practising the injection just before bedtime. Expectoration is lessened, bacilli diminish in numbers, ulcerations cicatrize, fever subsides, and bodily weight increases. A number of instances are detailed. It is believed that the menthol acts as a topical anæsthetic, its effects being far more general than when administered by inhalation, while its antiseptic influence

is largely diffused along the bronchi and throughout the whole lung. The active ingredients introduced, menthol and guaiacol, volatilize slowly, and thus exert a continuous beneficial influence. Chalybeate tonics and plentiful supplies of milk are used in connection with the intra-laryngeal injections.

[The compiler has used these injections with great satisfaction, but his injections produce cough, with expulsion of some of the liquid. The point of the syringe is carried a considerable distance below the vocal bands. He has seen copious purulent expectoration reduced more than half after the first injection.—ED.]

CYST OF THE MIDDLE TURBINATED BONE.

DR. CHARLES H. KNIGHT, of New York, describes (*New York Medical Journal*, 1892, No. 12) and illustrates, both macroscopically and microscopically, a large cyst of the right middle turbinated bone removed from a woman of middle age, whose corresponding nasal passage had been completely occluded by the mass. The paper discusses the clinical history of this lesion, its pathology, and treatment.

FOREIGN BODIES IN THE ŒSOPHAGUS.

DR. ROBERT ABBE, of New York, reports (*Ibid.*, 1892, No. 12) a case of stricture of the œsophagus in an adult male, which was due to the impaction of a tooth-plate that had lodged in the lower portion of the œsophagus for more than a year. Œsophagotomy was performed to give external access to the foreign body, which was safely withdrawn in the grasp of long-curved dressing forceps, some digital manipulation being necessary to free the imbedded hooked ends of the plate several times during its withdrawal. The œsophagus had become dilated into a fusiform pouch in which the plate could move.

The submucous and muscular coats of the œsophagus were adjusted with continuous fine catgut suture. The patient did well, and was discharged on the fifteenth day. He was reported as still improving two months later.

RHINO-SCLEROMA.

DR. JOHN DUNN, of Richmond, Va., reports (*Ibid.*, 1892, No. 13) and illustrates an interesting case of scleroderma in a male negro, which probably originated in a rhino-scleroma.

PRIMITIVE TUBERCULOSIS OF THE LARYNX.

M. TRÉKAKI reports (*Annales des Mal. de l'Oreille, etc.*, 1892, No. 2) a case in a man thirty-five years of age with tertiary syphilitic lesions of the tongue. Difficulty of respiration occurred, augmenting gradually, and culminating in continuous dyspnœa without any critical attacks, night or day. There was supra- and sub-sternal retraction with maintenance of the semi-recumbent position. The lungs were freely pervious. The voice was strident and veiled, and the respiration was audible at a distance. Laryngoscopy was impracticable. The patient was treated for syphilis. The dyspnœa augmented.

One day, without special cause, the patient rose from his seat an hour after dinner, gasped for breath, and died after several convulsions; death having been rapid, but not sudden.

Autopsy revealed recent conglomerations of small masses of tubercles in the lungs, with a tuberculous tumor in the larynx occupying the left ventricular band and extending as far as the glottis so as to prevent the play of the left vocal band, and almost completely obstruct the larynx at that point, barely giving passage to a grooved director. No other portion of the mucous membrane seemed to have undergone alteration.

Bilateral Suppuration of the Maxillary Sinus.

Dr. Lichtwitz, of Bordeaux, contends (*Annales des Mal. de l'Oreille, etc.*, 1892, No. 2) that the bilateral disease is much more common than it is supposed to be. He commends exploratory lavage of the sinuses in every case of nasal blennorrhœa as a diagnostic procedure, which he practises through an artificial opening made in the inferior nasal meatus by means of a delicate trocar.

Suppuration in the Maxillary Sinus.

A case of acute empyema of the maxillary sinus, commencing about three weeks after pain was first established in the teeth, was seen by Dr. Marcel Natier, of Paris, fifteen days later (*Rev. Internat. de Rhin., Otol., et Laryngologie*, 1892, No. 2). It was cured in forty days by penetrating the sinus with a trocar at the second molar, and systematic syringings with solutions of boric acid.

Latent empyema of the maxillary sinus has been made the subject of a thesis by Dr. Marcel Jeanty, of Bordeaux (*Idem*). He recognizes two sets of causes: 1. Injuries, accidental or surgical; and 2. Propagations of inflammatory processes in the vicinage. His essay is based upon twenty-two unedited cases in addition to those reported by earlier writers.

The Constitutional Origin of Local Disease.

In a thoughtful paper on the relation of disturbances of the mucous membrane of the upper air-passages to constitutional diseases (*N. Y. Med. Journ.*, 1892, No. 13), Dr. Beverley Robinson, of New York, emphasizes the importance of studying diathetic conditions, whether hereditary, or whether due to contagion, or to insalubrious surroundings.

Tuberculosis, syphilis, scrofula, gout, carcinoma, and alcoholism, are cited, among other conditions, which are liable to give rise to chronic inflammations of the mucous membranes of the upper air-tract.

Influenza.

In a paper on the symptoms and pathological changes in the upper air-passages in influenza (*N. Y. Med. Journ.*, 1892, No. 13), Dr. J. Solis-Cohen expresses the opinion that the immediate anatomico-pathological lesion is

one involving the lymphatic organs and structures, with consequent accumulation of lymph in the connective tissue. With this there is a paretic condition of the nervous system, in partial result of which there is a stasis in the venous and lymphatic circulations. Hence, passive sanguineous congestions, ecchymoses, and hemorrhages from the one, and passive lymphous congestions, and lymphous or mucoid exudations from the other. Fibrinous exudation occurs in some instances, and a typhoid grade of inflammation in others, sometimes terminating in suppuration and in discrete or in diffuse abscess.

Asthma.

In a paper on the result of treatment of the upper air-passages in producing permanent relief in asthma (*N. Y. Med. Journ.*, 1892, No. 13), Dr. Francke H. Bosworth reiterates his great confidence in intra-nasal treatment as promising relief both more immediate and more permanent than any other method yet suggested. At the same time he recognizes a neuritic habit as a factor equally prominent with nasal obstruction, and insists upon the importance of suitable hygienic and medicinal measures in addition to the topical treatment.

Mucous Nasal Polypi in Children.

Interested by a case of congenital mucous polypi in the left nasal fossa of a newborn child, reported by Dr. Le Roy at the Société Medicale du VIIe Arrondissement, and knowing of a similar instance reported by M. F. Cardone, Dr. Marcel Natier was induced to make a study of the subject of similar growths in children (*Annales de la Policlinique de Paris*, 1891, No. 7). He has found no other records of the growth at birth, but has collected a series of thirty-one cases in subjects under the age of fifteen years. Five occurred in children under five years of age, ten in children between five and ten years of age, and sixteen in children between ten and fifteen years of age. Twenty-three were in boys and six in girls; the sex being unmentioned in two. Seven are mentioned as occupying the right fossa, and five the left. In fifteen cases the growths were single, in fourteen they were multiple.

Follicular Angina.

Several experimental observations to determine the etiology of angina follicularis, undertaken by Dr. J. Sendtner, of Munich (*Münchener med. Wochenschr.*, 1891, No. 26), demonstrated that the pus contained exclusively a streptococcus which could not be differentiated bacteriologically from the streptococcus pyogenes and erysipelatus. The presence of this streptococcus is believed to account for the occasional fatal course of the disease; the richness of the tonsillar tissue in lymph vessels favoring constitutional infection.

A fatal case of streptococcian angina tonsillaris is reported by M. V. Hanot (*Arch. Internat. de Lar., etc.*, 1892, No. 4), in which a retro-pharyngo-

œsophageal abscess ruptured into the right pleural cavity, producing purulent streptococcian pleuritis, empyema, and death.

Two cases of angina with pneumococci reported by DR. RENDU, of the Necker Hospital (*Idem.*), support a new theory in the etiology of some anginas. Both of these patients were exposed to whatever infection there may be from contact with cases of pneumonia, one as a nurse, the other as a patient. The attacks began as pneumonia or typhoid fever might begin, but the sole lesion was sore-throat with moderate tumefaction of the tonsils. Under symptomatic treatment sudorific defervescence occurred rapidly on the fourth day, absolutely analogous to what is observed in legitimate pneumonia.

MORBID GROWTHS OF THE NASAL PASSAGES.

An unusually large myxofibroma growing from the posterior extremity of the left lower turbinate body, and projecting considerably into the oral cavity, was removed by DR. NORRIS WOLFENDEN from a girl fifteen years of age, by means of the Jarvis snare passed through the nose. The tumor was conical in shape; and, as in all such polypi seen by Dr. Wolfenden, was dense and fibrous in its lower pendent portion and myxomatous at its upper portion. A few months previously to the recognition of this growth, some ten months before the operation, multiple polypi had been removed from the nose, and a few days after the operation a second mass of polypus was removed from the nares.

ERYSIPELAS OF THE PHARYNX AND LARYNX.

In a paper read by PROFESSOR MASSEI, of Naples, at the Tenth International Medical Congress in Berlin (*Wiener med. Wochenschrift*, 1891, Nos. 12 u. 13), a summary of the chief original literature on the subject is given supplemented by results of the study of a number of personal observatisns, some fourteen of which were published at Naples in 1885 ("Sulla Erisípela della Laringe"). The conclusions are summarized as follows:

1. Despite the lack of bacterial investigations the existence of erysipelas of the pharynx and the larynx can be determined clinically.

2. In all probability primary pharyngeal erysipelas is always complicated with laryngeal erysipelas, while the pharynx may escape in primary laryngeal erysipelas.

3. Primary erysipelas of the larynx may be recognized by the constant and sudden intense tumefaction of the epiglottis, the high fever, and the progressive character of the swelling which distinguishes it from other forms of swelling, especially that of phlegmonous laryngitis.

4. Erysipelas of the pharynx and larynx occurs epidemically as well as sporadically, and is not so infrequent as is generally believed.

5. Two forms can be distinguished, which are important in forming a prognosis; in one of which the local disturbances predominate, and one in which the constitutional disturbances predominate.

6. Ice, sprays of sublimate solution, and tracheotomy are the most potent therapeutic remedies, while the effect of the usual medicaments are problematic, although they may be effective in individual cases.

Recurrent Facial Erysipelas Cured by Removal of Adenoid Vegetations at the Vault of the Pharynx.

Professor H. Lavrand, of Lille, reports (*Rev. de Lar., etc.*, 1891, No. 15) a case of recurrent facial erysipelas in a female nurse in charge of idiots, and who never came near surgical cases. The attacks occurred most frequently about the menstrual epoch, sometimes just before, sometimes just after. Sometimes they occurred twice a month. The onset was always identical. First, a more or less pronounced malaise toward night, and an erythema about the wings of the nose the next day. Some attacks were light, others severe. There were hypertrophy of the middle and lower turbinates sufficient to impede respiration. Cephalalgia was frequent. The voice was husky. The pharynx was the seat of chronic catarrh with few granulations, and there were moderate adenoid vegetations at the vault of the pharynx. Cauterizations of the turbinates and treatment of the rhinopharyngeal catarrh had no effect on the erysipelas. When, however, the adenoid vegetations had been scraped away, there was no recurrence of erysipelas. The voice remains husky and the cephalalgia continues. Similar successes have been obtained by the same observer in similar instances.

It is presumed that the succulence of the adenoid vegetations favored the lodgment and development of the microcosms of Fehleisen, and that the nose was not the point of departure of the erysipelas.

Paralysis of the Posterior Crico-arytenoid Muscles.

In a case of bilateral paralysis in a tabetic man, thirty-seven years of age, Dr. Ruault had a centimetre and a half of the inferior laryngeal nerve excised by Dr. Ch. Monod without the slightest benefit, although the nerve was found diseased (*Ann. des Mal. de l'Oreille*, etc., 1891, No. 7). The failure to produce complete paralysis of the recurrent, and thus reproduce a normal passage for respiration, is regarded as confirmative of the opinion held by Exner and others that the muscles to which the inferior laryngeal nerve are distributed receive additional innervation from the superior larngeal.

Paralysis of the Recurrent Laryngeal Nerve.

Dr. Landgraf has reported (*Ann. des Mal. de l'Or.*, etc., 1891, No. 7) a case of complete paralysis of both recurrents observed eight days after a primary paralysis of the dilators of the larynx, which took place suddenly after fourteen injections of tuberculin carefully practised for tuberculosis of the apices of both lungs in a male, twenty years of age. The patient died shortly after. The left crico-arytenoid muscle was paler than the right, and its fibres largely degenerated. There were no tuberculous glands in the mediastinum. The recurrent nerve was greatly degenerated, and this was attributed to primitive inflammation of the neurilemma.

Carcinoma of the Larynx.

Baginsky reports (*Berl. klin. Wochenschr.*) a case of carcinoma of the larynx occurring as a consequence of carcinoma of the thyroid gland, in a man

forty-eight years of age. During life the left vocal band was immobile in the middle line. The right vocal band was not drawn tense in phonation, but remained sickel-shaped, so that its furthest point from the left band was about 3 mm. There was a circular ulcer on the vocal process of the right arytenoid cartilage. There was a peculiar tremor of the left arytenoid cartilage which made intermittent jerky movements in which the tense left vocal band did not participate.

At the autopsy a carcinoma of the thyroid gland was found to extend between the trachea and œsophagus and into the jugular fossa and in front of the larynx.

Compression of the Trachea.

It is well known that severe dyspnœa is occasionally produced by compression of tumors outside the air-passages. A case in point producing stenosis of both larynx and trachea has been reported by Dr. F. Schiffers (*Rev. de Lar., etc.*, No. 19), due to an extensive carcinoma in the mediastinum which had invaded the left bronchus, the pericardium, and the vessels at the base of the heart. At the laryngoscopic examination, six days before death, there was complete immobility of the left vocal band and luxation forward of the corresponding arytenoid cartilage. The patient had been able to work until within two or three weeks. Dyspnœa had existed for three months and hoarseness about two months and a half. There was no loss of appetite and no cancerous cachexia. Tumefied and hardened glands existed in the subclavicular regions, the left more especially, and in the left retromaxillary region. The diagnosis had been made, chiefly by exclusion and based upon the enlarged gland in the neck, and especially those in the left subclavicular fossa.

Nystagmus or Clonic Spasm of Vocal Bands.

Under this name, first used, we believe, by Dr. Spencer, Dr. B. Baginsky describes (*Berliner klin. Woch.*, 1891, No. 50) a case of clonic rhythmic spasm of the adductor muscles of the larynx, 50 to 54 in the minute, and recalling the pulsations of a heart; and which has in no wise changed during more than two years' observation, despite every therapeutic measure. It occurs in an hysterical patient, sixty years of age, whose other and previous neurotic manifestations have been described by a number of authors since 1859, and in whom ovariotomy was performed in 1882 with negative results. The patient, when fifteen years of age, had been wounded with a stone thrown against the right side of the forehead, and suffered for six weeks with symptoms of inflammation of the brain. In the same year she got a pneumonia and had repeated recurrent hemorrhages. When twenty years of age she got pains in the abdomen, and paralysis and insensibility of the left leg so that she could neither stand nor walk. The paralysis gradually subsided under electric treatment so that the patient could get about again on crutches. When twenty-nine years of age intermittent and very obdurate aphonia set in for the first time; and somewhat later paroxysms of dyspnœa, frequent emesis, spasmodic cough, and sometimes convulsions. At the same time a left-sided ovarian tumor developed. The spasmodic manifestations receded

under Remak's treatment. In May photophobia and severe duplex blepharospasm set in suddenly, and these ceased after a nerve section practised by von Graefe. After further frequent repetitions of the previous disturbances, and which always subsided temporarily, the patient in 1882 again had almost complete aphonia, very marked dyspnœa, and very much accelerated respirations. Laryngoscopic inspection then revealed impaired approximation and tension of the vocal bands in phonation as the cause of the aphonia.

In addition to the aphonia she had nausea, emesis, and a series of abnormal sensory and motor disturbances, especially on the left side, with left hemianæsthesia. Ovariotomy was performed by Landau in 1882 with negative results. All the neurotic symptoms remained and some of them increased in intensity. When sent to Baginsky's clinic, the only subjective symptom complained of was the hoarseness. Laryngoscopic examination disclosed the usual evidences of chronic catarrh, with special implication of the posterior wall of the larynx, and moderate impairment in the adduction and tension of the vocal bands.

In addition, there was a unique spasmodic movement of the vocal bands during the expiratory phase of the respiratory movements which numbered some 52 to 54 in the minute, with a pulse of 92. This movement was a constant, almost regular clonic spasm of the vocal bands and arytenoid cartilages recurring some 50 to 54 times in the minute. The short adduction movements brought the vocal bands to about the cadaveric position, but no further. They followed rather regularly at the close of the expiratory movement, and were in part associated with it, but they did not extend into the inspiratory movement. Rapid respiration and voluntary inspiratory stridor arrested the clonic spasm for a few minutes, after which it recurred with greater intensity.

This condition has continued constant for two years without any modification, and despite all therapeutic interference. It is the first case of continuous clonic spasm of the larynx on record, and for which, as a special manifestation of hysteria, Baginsky suggests the term nystagmus of the vocal bands analogous to nystagmus of the eyes.

Fibrinous Rhinitis.

Dr. Lieven has written an elaborate article on "Rhinitis Fibrinosa" (*Münchener med. Woch.*, 1891, No. 48), stimulated thereto by a series of cases presenting in rapid succession in the clinic of Dr. Seifert, of Würzburg. Acute fibrinous rhinitis occurs in the form of an intense acute rhinitis, the secretions of which become rapidly purulent and readily fetid. After the third or fourth day pseudo-membranous layers are formed, sometimes insulated upon the turbinate bodies or on the septum, sometimes accumulating in continuous masses sufficient to cover the entire surface of one or both passages. Its most frequent seat is the respiratory portion of the passages. It may be diffluent or acquire a thickness of five millimetres. Eczema of the upper lip is readily excited by the intense secretions of the first few days and the surface may become covered by a continuation of the membrane from the nose. Lieven has frequently observed that the naso-labial fold is a favorite spot for the extension of the exudation upon the excoriated upper lip. If mem-

brane be removed, membrane recurs by the next day. This renewal can be stopped in eight or ten days by antiseptic treatment, but in neglected cases it may continue for months.

Lieven instituted bacteriological investigations, and succeeded in the very reprehensible practice of transferring the affection to the human subject, the details of which are given.

Dr. Middlemiss Hunt reports (*Journ. of Lar. and Rhin.*, No. 12) a case temporarily associated with croupous tonsillitis. The false membrane was renewed daily after removal for several days, and finally ceased to form about the fifteenth day, when it was followed for some ten days by a muco-purulent discharge. The patient's sanitary surroundings were healthy; the case was an isolated one in the family, and there was no diphtheria in the neighborhood.

Deflection of the Nasal Septum.

Mr. Mayo Collier contends (*Journ. of Lar. and Rhin.*, No. 12) that an enormous number of deflections of the septum narium are due to paralysis or paresis of the muscles of the nose. He has carefully examined the septa of more than one thousand living subjects, and he finds that some deflection or irregularity is within 10 per cent. a constant feature of adult life, while it is only in young persons under puberty in whom we may expect to find a majority of normal septa. He calls attention to the fact that 80 per cent. of savages and aborigines have undeflected septa. Then he argues that obstructions in the nasal passages, whether the result of catarrhal or other causes, increase the external air pressure by rarefaction during inspiration, and that these successive pressures or blows long continued must bend the thin and yielding portions of the septum inward.

OBSTETRICS.

UNDER THE CHARGE OF

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Twin Ectopic Gestation.

Robinson (*New York Medical Journal*, 1892, No. 25) reports the case of a multipara who suffered from influenza, followed by obstinate vomiting and incipient nephritis. It was deemed advisable to produce abortion, and under ether the uterus was dilated and found to contain only a few blood-clots; near the mouth of the right Fallopian tube a roughened surface was detected. After an intra-uterine douche the faradic current was applied for fifteen

minutes. A history of ectopic gestation, with discharge of offensive material, was given. Eleven days after the examination of the uterus, the patient's pain, which had been largely in the right iliac fossa, became uterine in character. Two embryos, about fourteen weeks old, were passed at intervals of twenty-four hours. The uterus was curetted and fragments of membrane and placenta were removed from the vicinity of the mouth of the right Fallopian tube. Hemorrhage continued, peritonitis supervened, and the patient died of exhaustion; a post-mortem examination was not obtained. The patient was considered too weak for operation. Robinson is positive, from examination of the patient, that *uterus bicornis* was not present.

Intra-venous Injection of Saline Fluid in Puerperal Hemorrhage.

Spencer reports in the *Lancet*, 1892, No. 3590, eight cases of severe hemorrhage in which intra-venous transfusion of saline was performed ten times. Four of the patients died, four recovered. The hemorrhage is checked before the treatment is put in force; the fluid employed is sodium chloride, one drachm to the pint, at a temperature of 105° F. From thirty to forty ounces is injected into each median cephalic vein.

[In the absence of the facilities for transfusion this fluid may be injected deeply into the connective-tissue spaces by any convenient sterilized apparatus. Spencer describes and illustrates an admirably designed bottle for such purposes.—E. P. D.]

Pregnancy Complicated by Nephritis and Internal Hemorrhage.

An interesting case, illustrating a frequent cause of dangerous bleeding in pregnant women, is described by Schauta (*Internationale klinische Rundschau*, 1892, No. 27). The patient was a multipara, aged forty-four years, who was pregnant nearly at term. She presented symptoms of internal hemorrhage, namely, a tense condition of the uterus with feeble pulse, great anæmia, and but slight external bleeding. Her child was but feebly alive. Placenta prævia was excluded, and examination of the cervix revealed no lesion to account for the hemorrhage. The urine contained albumin, 1 to 1000; the patient was exceedingly pallid and her intellect was clouded. As the os uteri was but slightly dilated and the membranes were unruptured, it was thought best not to promote active labor. A subcutaneous injection of saline fluid was administered, which improved the patient's pulse. As her circulation failed alarmingly shortly afterward, it was determined to terminate labor. The child's heart-sounds had ceased, and accordingly craniotomy was done by trephining. Extraction was readily accomplished. The placenta was manually removed, and large masses of blood-clot were delivered. The uterus contracted well, and but slight hem orrhage occurred, which was checked by an iodoform-gauze tampon. The patient failed to rally, and died an hour after delivery. Post-mortem examination revealed chronic interstitial nephritis; weak and degenerate heart muscle, without hypertrophy; the uterus large, but contracted.

The case is of interest as illustrating the following points: Resulting from chronic nephritis there was present an extensive degeneration of the small

bloodvessels of the endometrium and placenta. Commencing labor-pains resulted in passive hemorrhage which partially separated the placenta, a clot forming between the wall of the uterus and the placenta. While dangerous bleeding before the membranes rupture is infrequent, yet the present case furnishes an illustration of a condition which may cause fatal hemorrhage without symptoms usually present. Extensive placental disease which usually destroys fœtal life is found in these cases. Treatment should, therefore, be addressed to saving the mother's life, without much regard to the interests of the child.

A Successful Conservative Cæsarean Section.

Strauch, of Moscow, recently performed successfully the conservative Cæsarean section in the case of a multipara who had been several times delivered by induced labor and craniotomy. During his operation he was interested to observe that the passage of the deep sutures excited intermittent uterine contractions. He believes from his experience and study in the subject that operation is best undertaken during the pains. A quarter of an hour before the operation it is well to give a full dose of ergot. Where the intestines do not prolapse, it is unnecessary to suture the upper angle of the abdominal wall while opening the uterus. The elastic ligature should not be drawn tightly about the uterus before it is opened; it would thus interfere with the contraction of the uterus. It should be applied loosely but not tightened unless hemorrhage occurs. The external genitals should be frequently inspected during the operation, as a considerable hemorrhage is easily overlooked. When the operation is done with unruptured membranes and the uterus contains no septic material it is needless to molest the interior of the uterus with antiseptics after it is empty. The lochia after Cæsarean section are always scanty, because there are no wounded surfaces in the cervix and vagina from which pus may come.—*St. Petersburger medicinische Wochenschrift*, 1892, No. 23.

A Fatal Case of Accidental Hemorrhage at Eight and a Half Months.

At a recent meeting of the Obstetrical Society of Paris, Maygrier (*Bull. et Mém. de la Société Obstétricale de Paris*, 1892, No. 8) described the case of a woman who sought rest in a hospital after a long and fatiguing journey on foot. A few days after admission, while seated upon a vessel to take a vaginal injection, she was seen to become suddenly unconscious. She was found to have had a severe hemorrhage. A vaginal tampon and stimulants were promptly used, but she soon perished.

At the post-mortem examination, the placenta was found to have been normally attached, and not in the lower uterine ligament, as was supposed. It had been partly separated, although no evident cause for the separation was found. No explanation of the fatal issue of the case is given; the patient had once suffered from hemorrhage after abortion, but had borne three living children in normal labors.

In discussing the cases, Pajot gave his rules for the use of the tampon and ergot as follows: The vaginal tampon should only be used when the uterus is full; ergot should only be given when the uterus is empty, not only of the fœtus but of clots and débris.

The Treatment of Disorders of the Teeth during Pregnancy.

In the *Birmingham Medical Review*, July, 1892, Elliott describes several diseased conditions of the teeth and gums occurring during pregnancy. In anæmic patients the gums become thin, pale, and shrivelled in appearance and retracted from the edge of the teeth; a prominent ridge is often seen near the free border. In other cases the gums are full and reddened, apparently deeply congested and containing pus, which exudes on pressure.

An important factor in producing caries of the teeth is the altered condition of the secretions; their reaction becomes acid instead of alkaline, which favors markedly the disintegration of the teeth. Caries of the teeth is often accompanied by a brownish discoloration on the labial surface of the tooth following the outline of the gum; the enamel is brittle and opaque. The upper bicuspids and molars are often carious, the dentine being softened but not discolored. The lesion in these cases is caused by the fact that the tongue lies frequently in contact with these teeth, and its acid mucus and matter vomited come frequently in contact. In anæmic patients "white" or soft caries accompanied by absorption of the alveolar process is observed; the teeth become so loosened as to frequently come out.

Neuralgic pain in or about the teeth is sometimes so severe as to delay labor. Hysterical pain in the teeth sometimes extends to several, may be fixed in two sound teeth, or may shift from side to side.

As regards treatment, quinine and opium may be used when the gums are anæmic; ammonium chloride and aconite when full and congested. Chlorate of potassium and potassium bromide are efficacious in irritable gums and teeth. Equal parts of charcoal and prepared chalk are useful as a local application to irritable teeth and gums. In reflex pain in the teeth and gums a blister three by one inch in size applied over the fourth and fifth dorsal vertebræ, often affords relief. When pain in the teeth is constant and depressing, removal under an anæsthetic is indicated.

PÆDIATRICS.

UNDER THE CHARGE OF

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The Propulsive Power of the Stomach in Young Children.

Up to the present time all researches upon the propulsive power of the stomach in young children have been made with the gastric sound, according to the method of Leube. The conclusions of Epstein, Leo, Van Puteren, Einhorn, Pipping, and others, seem to have established the facts that the

propulsive power of the stomach is relatively greater in young children than in adults, and that this power is more or less diminished in various digestive disturbances. A new investigation of the subject has been undertaken recently by PFANNENSTIEL, of Stockholm (*Nordiskt Medicinskt Arkiv*, 1892, Band ii. Heft 2), who has employed the salol method already used in adults by Ewald and Sievers, with its modification as suggested by Huber. In a series of sixty healthy children the times of the earliest and latest appearance of salicyluric acid in the urine after the administration of salol were found to be, in the former case, forty to sixty minutes, and in the latter, twenty-seven to twenty-eight hours. These figures agree almost exactly with those found by Ewald and Sievers and by Huber for adults. Therefore, it may be concluded that the close approximation of the results of the experiments of these different observers, with both adults and young children, puts much doubt upon the opinion that the propulsive power of the stomach is relatively greater in young children.

The same method was used upon twenty-seven children under one year who were suffering from various digestive troubles (cholera infantum, acute and chronic gastritis, enteritis, and gastro-enteritis), and it was found that, while the time of the earliest reaction of the salol derivative to the chloride of iron had in no way been retarded, this reaction persisted long after the normal period of its disappearance in a physiological state of health, in several cases the test showing the presence of the drug as long as one hundred and twenty-four and one hundred and forty-four hours after its administration. The author, therefore, concludes that the method of Ewald and Sievers is useless for basing any conclusions as to the propulsive power of the stomach in young infants, but that Huber's modification is of great practical value, offering many advantages over that of Leube, which is, besides, extremely disagreeable to the patient. From a practical point of view, such exploration is of value both in diagnosis and in therapy. In the former it aids in deciding whether the morbid process is principally localized in the stomach or the intestine, while in the latter it furnishes light upon the question whether lavage of the stomach be desirable—for one of the most important indications for this therapeutic procedure is a diminution of the propulsive power of the viscus.

THE TRANSMISSION OF LUMBRICOID WORMS.

The researches of Richter, Küchenmeister, and Davaine have established the opinion that the presence of the lumbricoid worm is due to a direct infection by the ingestion of food, principally legumes and fruits, and water containing the eggs. The only other theory is that of Leuckart, which assumes the intermediation of a parasite—the parasite of meal—carrying within it the eggs of the ascaris. Previous experiments in the ingestion of the eggs by animals and man, which have been made by Grassi, Lutz, Leuckart, and others, have yielded no definite results; but a recent investigation of the subject by EPSTEIN, of Prague (*Jahrbuch f. Kinderheilkunde*, 1892, Band xxxiii. p. 287) has been much more successful. In the first place, he has determined under what conditions the eggs can be most successfully incubated, and has found that the best culture-medium is the diarrhœtic stool under free

exposure to the air and sunlight at quite an elevated temperature and with a certain degree of humidity. The embryos develop but slowly when the eggs are cultivated in moist earth or in water.

Experimental administration of eggs containing living embryos was made with three children who had been submitted to rigid tests and had been prepared for the experiment by a carefully chosen and sterile diet. At the end of three months eggs, and, after santonin, the worms themselves, were found abundantly in the stools—a result which proves quite conclusively the part of direct infection in the etiology of this form of helminthiasis in children. A fourth child, who had received dried cultures of the eggs which contained no living embryos, developed no worms.

These experiments also throw light upon certain points in the biology of lumbricoids. The earliest appearance of the second generation of eggs occurred between the tenth and twelfth week after the ingestion of ova containing living embryos. Toward the twelfth week the female measured twenty to twenty-three centimetres in length, the male thirteen to fifteen; after this, there was little increase in length.

These facts also go to explain why the worm is more frequent among the children of warm countries, like Italy, Egypt, and Brazil, where they live so entirely out of doors, and why it is more rare among the children of cities than those of the country. Among 300 children whose stools were examined, ova were found in 43 per cent; of this number 52 per cent. lived in villages near Prague, while only 3.7 per cent came from the city itself.

Variola, Varioloid, and Varicella.

In the course of a study under this heading, Biedert (*Jahrbuch f. Kinderheilkunde*, 1892, Bd. xxxiii., p. 427) draws the following conclusions as to varicella:

1. Varicella may be accompanied by grave general phenomena simulating in a very striking manner the aspect of variola.

2. It is not always easy to differentiate this disease either from varioloid or from variola modified by previous vaccination.

3. If the differential diagnosis is difficult, it is none the less established that varicella and variola are distinct diseases, contrary to the opinion lately advanced by Hochsinger, that patients suffering from varicella may transmit true variola to others.

As to variola he makes the following deductions:

1. Variola is less contagious before the eruptive period than after it. Light varioloid is less contagious than grave variola.

2. Some unvaccinated individuals are much less susceptible to the disease than others. After vaccination, some lose their immunity at the end of one or two years, but the great majority remain protected for seven years, or even longer.

3. After a successful vaccination, immunity is established in about eight days. Vaccination performed after infection does not guard against the development of variola, but if done eight days before the eruption the evolution of the disease takes place benignly.

Incontinence of Urine caused by Enlarged Spleen.

Bobulescu, of Bucharest (*Revue mens. des Maladies de l'Enfance*, May, 1892, p. 225) reports two interesting cases in children, in which a mechanical incontinence was induced by enormous hypertrophy of the spleen, of malarial origin. The first instance was observed in a boy of four years, who had suffered from tertian, quartan, or double quotidian paroxysms for a year, two years previous to his examination. The splenic tumor was smooth, hard, and very slightly mobile, extending from beneath the false ribs well into the iliac fossa, the left border merging into the flank, while the right could be traced nearly to the linea alba, presenting an indentation at the level of the umbilicus, and disappearing behind the pubes. Incontinence had been observed for sixteen months, whenever the child would run or execute any sudden movement. The second case was observed in a boy of five years of age, with a history of malaria of two years' standing. The spleen was more movable than in the first patient, occupying the hypochondrium, the flank, and the left iliac fossa, and bordering on the linea alba from the umbilicus to the symphysis pubis. This child often had involuntary micturition during paroxysms of the disease and when he ran about.

All other causes of paroxysms were rigidly excluded; and the fact that under treatment by quinine the splenic tumor was rapidly reduced in size and the incontinence cured, shows that the enlarged spleen had acted as a mechanical irritant by touching and compressing the bladder.

Gonorrhœal Rheumatism in Children.

Béclère (*Revue mens. des Maladies de l'Enfance*, June, 1892, p. 278) reports two cases of this very rare, but not unknown, affection in childhood, one in a little girl of five and a half years, the other in a female infant of twenty months. The first child had been the victim of an attempted violation, and in the course of a resulting vulvo-vaginitis and blennorrhagic urethritis she developed an arthritis of the radio-carpal articulation, with a synovitis of the extensor tendons. In the case of the infant of twenty months, the ankle-joint was involved during the course of a specific vulvo-vaginitis, contracted by accidental contamination from a blennorrhagic discharge from the mother. In the literature of the subject the author has found no cases like his own, except the two reported by Koplik, of New York, both in little girls, aged three and a half and five years, respectively. Deutschmann, however, has observed two newborn infants, who at the age of three weeks presented articular manifestations in the course of blennorrhagic ophthalmia. It therefore is evident that gonorrhœal rheumatism may occur in childhood from one of three modes of infection: blennorrhagic ophthalmia, especially of the newborn, specific vulvo-vaginitis consecutive to attempts at violation, or, finally, accidental contamination from the mother or nurse.

Infantile Eczema.

At the recent meeting of the American Medical Association, Dr. B. M. Ricketts, of Cincinnati (*Medical Record*, 1892, vol. xlii., No. 1, p. 27), read

a paper on this subject. The most common cause of this disease (in 95 per cent. of all cases in the speaker's experience) is an excessive use of soap and water. The vesicular form is the most common. The child becomes irritable, restless, loses weight, and has a depressed appearance in general. It may have diarrhœa or may be constipated, or these conditions may alternate with each other. The skin is reddened, resembling erysipelas, with a laceration here and there. Crusts may extend over the body. The temperature usually ranges from one-half to one degree above normal. When the hands are involved, it is usually on the fingers and dorsal surface that the disease is most extensive. In treatment the author prohibits the use of water in any form, prescribing a solution of olive oil and carbolic acid (1 to 50), to be applied several times a day. The use of tea and coffee and all stimulants is forbidden, and the diet regulated to the age of the patient. One-twentieth of a grain of calomel is given every two hours. If this treatment is not followed by rapid improvement in a few days, salicylic ointment, ten grains to the ounce, is ordered. The influence of mercury is not understood, but is believed to be effective by an action upon the system, perhaps in changing the reaction of the secretions.

The Sterilization of Milk at Low Temperature.

According to Rowland G. Freeman (*Medical Record*, July 2, 1892, p. 8), the problem that presents itself in the sterilization of milk for good is to devise a method which shall destroy by efficient means the contained germs, and yet in the least possible degree interfere with its nutritive qualities. The experiments of Leeds show that sterilization at the boiling-point of water causes the following modifications: the starch-liquefying ferment is destroyed and coagulated; casein is rendered less coagulable by rennet, and is acted on slowly and imperfectly by pepsin and pancreatin; proteid matters attach themselves to fat-globules and probably bring about a less perfect assimilation of fat; while milk-sugar, by prolonged heating, is completely destroyed. Koplik states that "from the temperature of 75° C. upward there is a separation of the serum-albumin of the milk; the casein loses its coagulability to rennet, and at 85° C. amounts of rennet, which for the raw condition of milk are found sufficient to act, cease to be effective." Hueppe considers that, from a physiological standpoint, milk is best sterilized under a temperature of 75° C.; while other experimenters have shown that temperatures lower than 100° C., if continued for a short time, will destroy a very large proportion of the germs, and will destroy with certainty many pathogenic germs which find their way into milk either from the cow or as external contaminations.

The author, therefore, feels satisfied that Pasteurization offers the most rational solution of the question under consideration. The elaborate and recent experiments of Yersin, Grauchier, and Lidoux-Libard, and Bitter show that the bacillus tuberculosis in milk will be destroyed in ten minutes by an exposure of 75°; in fifteen minutes to 70°; and in thirty minutes to 68°. Concerning other bacteria, Van Geuns found that a few seconds' exposure to 60° C. would kill the cholera spirilla, the Finkler-Pior bacillus, the typhoid bacillus, and the pneumococcus of Friedländer.

It may, therefore, be concluded that a temperature of not less than 70° C.

will render milk sufficiently germ-free for infant food, and that a temperature of less than 80° C. will not injure milk materially. Methods of Pasteurizing milk in bulk have been brought forward both in Germany and in this country; and now, by the author's efforts, the procedure has been brought down to an easily managed system for household use. This depends upon the theory that the temperature of the milk to be treated may be raised to about the desired point (75° C.) by immersing a certain definite quantity of milk in a properly proportioned bulk of boiling water, the source of heat having been removed. The apparatus consists of two parts, a graduated pail for the water and a receptacle for the bottles of milk. This receptacle consists of a series of seven or ten hollow zinc cylinders fastened together, which fits into the pail containing the boiling water. Each of these cylinders is large enough to hold one of the bottles of milk, the series of seven cylinders accommodating seven eight-ounce bottles, and the series of ten cylinders being intended for ten six-ounce bottles. When the bottles are in place, water is poured around them to secure perfect conduction of the heat. After the water in the pail is thoroughly boiling it is removed from the stove and placed on a non-conducting surface. The cylinders are now introduced and the pail covered and left standing for thirty minutes, after which the milk is rapidly cooled in a refrigerator or by cold water or ice and water. Milk thus treated and put immediately into a refrigerator usually shows no change for several days.

The Bacillus of Measles.

Apropos of an abstract presented in this department last month, detailing the results of experiments of Canon and Pielicke, claiming the discovery of a pathogenic organism in the blood of patients suffering from measles, it seems only fair to state that MM. Josias and Laveran have announced at a recent session of the Société Médicale des Hôpitaux (*Le Progrès Médical*, 1892, No. 23, p. 441) that their independent researches, according to the methods described by the German investigators, have given only negative results. Josias examined the blood from twenty-four patients, and he states that he found neither the bacillus described by Canon and Pielicke, nor any other microbe. This testimony from other observers working according to the methods described by the original investigators seems worthy of record, although it is not by any means sufficient to seriously invalidate the apparently trustworthy results of the German authors.

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